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2013 EGSA Fall Technical & Marketing Conference

September 15 - 17, 2013 – Bellevue, WA

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Catalytic Reduction Systems

**The Greening of Diesel
Generators**

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Changing Grid Power to Mobile
Generator Sets for the US Military

**Batteries: The Go-To Building
Block for a Greener Grid**

Emergency Back-Up
Power Readiness

MIRATECH Member Profile

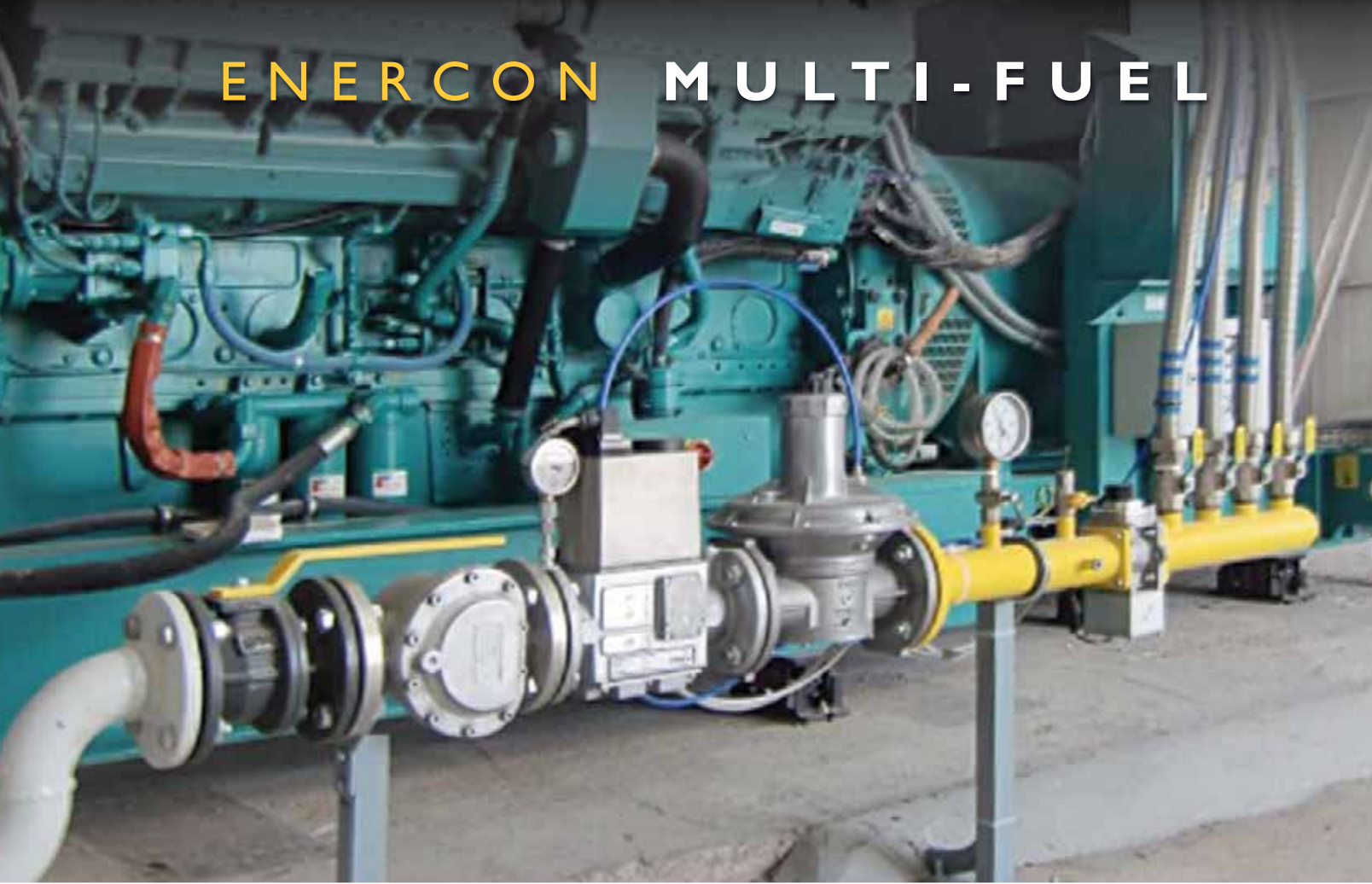


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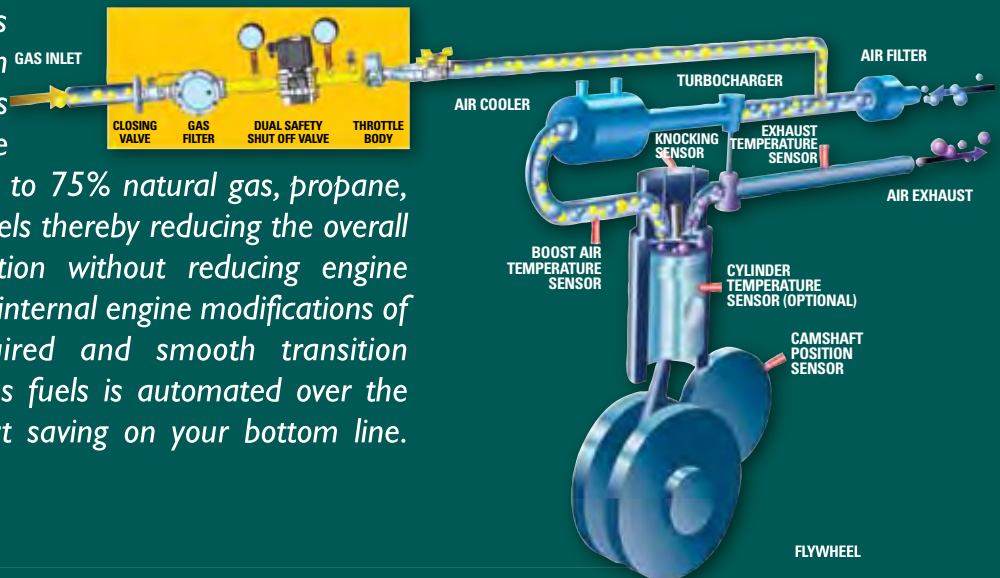


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EVENTS CALENDAR

Industry Trade Shows

POWER-GEN International 2013

NOVEMBER 12-14, 2013; Orlando, FL

The world's largest show for power generation, featuring the EGSA On-Site Power Pavilion. For exhibit information, contact EGSA at (561) 750-5575, ext 205 or e-mail Jalane Kellough at J.Kellough@EGSA.org.

Conferences & Conventions

EGSA 2013 Fall Technical & Marketing Conference

September 15-17, 2013; Seattle (Bellevue), WA

The Fall Technical and Marketing Conference is held during September and is designed to focus on technical and marketing issues. Register today at www.EGSA.org/fall.

NFMT Conference & Expo 2014

March 4-6, 2014; Baltimore, MD

The country's #1 conference and exposition for non-residential building owners; facility managers; maintenance engineers; directors of sustainability; planning; operations and management. EGSA has partnered with NFMT for the third year in a row the Power Source Pavilion. The Power Source Pavilion and educational sessions will provide facility professionals with exclusive access to on-site power solutions. For exhibit information, contact EGSA at (561) 750-5575, ext 203 or e-mail Kim Giles at K.Giles@EGSA.org.

EGSA 2014 Spring Convention

March 23-25, 2014; Savannah, GA

EGSA's Annual Spring Convention features educational sessions on a broad range of issues impacting today's On-Site Power industry. More information will be available at www.EGSA.org or by calling (561) 750-5575.

EGSA 2013 On-Site Power Generation Schools

The most complete overview of an On-Site Power Generation System available. Gain valuable Continuing Education Units (CEUs) by applying today! For information, visit www.EGSA.org or call (561) 750-5575.

Basic Schools

Austin, TX..... August 13-15

Orlando, FL November 12-14*

*To be held concurrently with POWER-GEN International 2013

Advanced Schools

Chicago, IL October 21-24



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Throughout every issue of *Powerline*, trademark names are used. Rather than place a trademark symbol at every single such occurrence, we aver here that we are using the names in an editorial fashion only. EGSA has no intention of infringing on these trademarks.

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Debra Laurents
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The Rowley School

Upon recommendation from the Education Committee, and approval by the Board of Directors, the EGSA On-Site Power Generation School is being renamed the “EGSA George Rowley School of On-Site Power Generation.” It will be informally known as “the Rowley School.”

The Education Committee had this to say: “George’s talents and hard work were instrumental in numerous endeavors and raised the level of professionalism and credibility of our educational programs considerably.” The renaming of the school is a small, but fitting way to honor a man who has had such an impact on EGSA.

Education is a key area of focus for our Association. In fact, one of our three goals is dedicated to education: “Provide the on-site power community with education and industry enrichment.” It is because of this long-time commitment to education that we decided to hire a full-time Director of Education in 2001.

George Rowley’s qualifications fit the bill. He has a Masters Degree in Education, and although his background is in Healthcare, he adapted very quickly to the power generation industry. He said in a letter to members last fall: “I didn’t know a volt from a watt when I first came onboard!”

Through his collaboration with the Education Committee as well as other members, he was able to take our education program to unforeseen levels.

Last year, George was in a very serious accident. Unfortunately, he was unable to continue in his role as Director of Education. A small group of us went to see him at his care facility last December during PowerGen. I still remember his big wave and welcoming smile when we arrived. His positive outlook and perseverance since the accident has been inspirational to many of us.

I asked several members who have worked closely with George, a few questions:

1. What do you see as George’s legacy to the association?

Dennis Pearson, Chairman, Education Committee (2011 to present): “The Basic and Advanced Power Schools were my first choice for George’s legacy. I also want to say that George has a talent that went way beyond his position. He is a coach. He has a way of bringing out the best in people.”

Dennis Roundtree, Board of Directors (2007-2009), and Education Committee Chair (2007-2008): “His legacy will be the transformation of our educational program from a volunteer-run, loosely organized series of seminars and papers to a professional, accredited educational program. The technical information and expertise was always there—George brought knowledge and understanding of the educational process to the organization and that impacted every facet of our programs, including the schools, the book, and the EGSA Technician Certification Program, all of it. The reorganization of the school, however, was his crowning achievement.”

Michael Pope, Immediate Past President, Executive Board (2008 to present), Board of Directors (2005-2007), Chairman, Education Committee (2003-2006): “Above all else, George brought organization to the EGSA education activities and programs. One of George’s first tasks was the updating of the Third Edition of *On-Site Power Generation: A Reference Book*. This was no easy task, since there were over 50 volunteer authors.

We set up a sub-committee of the Education Committee to direct the update of the Fourth Edition. It became immediately apparent that while George, by his own admission, knew little about the generation of electrical power, he has considerable knowledge and experience on educational



GEORGE ROWLEY
SCHOOL OF
ON-SITE POWER
GENERATION

Continued on page 16



Bob Breese
EGSA Director
of Education
b.breese@EGSA.org

Education & Certification Updates

Education

I don't know about you, but I am looking forward, with great anticipation, to September; I get to see my newest Granddaughter again (she'll be 15 months old)! Oh, and I get to attend the EGSA Fall Technical and Marketing Conference in Seattle! Both experiences will be fantastic!

In addition to the exciting speaker line-up and numerous other events, the Education Committee will have a lot of information to share in preparation for beginning the new year. Tech Certification updates, Power School Curriculum updates, E-learning updates and lots of other information. I encourage any who can fit it into their schedule of committee meetings to join the Education Committee. If you are straddling the fence about whether or not to attend, please get off the fence and join us. It will be a worthwhile experience!

Technician Certification

Where are the EGSA Certified Technicians? Occasionally, I get this question. The last time the "Where are they?" chart was published was May of 2012. Here is an update on the locations of certified technicians to the end of May 2013.

Since the last time we published this information California edged into the lead over Ohio by 6 technicians. Georgia is making up ground quickly and New York has simply exploded from 12 to 52! Many other states have shown significant increases. There are a few locations missing due to the technician(s) not recertifying. There are also a good number of technicians working for contractors overseas in support of U.S. Operations.

Some other thoughts regarding tech certification; I receive calls asking for the location of the nearest testing center. Ferris State will be more than happy to provide anyone who requests a proctoring location with the closest available facility that is authorized to administer the test. Simply send an email to EGSA@ferris.edu, with "Request for Testing Location" in the subject line. Be sure to include your name, location, and your contact information. If you know of a local community college, university, or technical college that is convenient to your location, include the name and address of that institution. Ferris State has numerous agreements with schools all over the country. If there is a suitable school that is closer to you, they will try to get an agreement with that new institution.

We appreciate your continuing support. I look forward to meeting many of you at the Fall Conference. Be sure to introduce yourself and tell me your story. As always, if you have suggestions for, or questions about, the EGSA Education Programs, please contact Bob Breese via an e-mail to b.breese@egsa.org, or by phone at (262) 225-3107. ■

Certified Technician Demographics

As of May 31, 2013 the number of EGSA Certified Technicians are distributed as follows:

76	CA
70	OH
67	GA
52	NY
46	VA
45	FL
41	TX
36	MI
33	CT; Ontario, Canada
32	IL
27	PA
25	AZ, NJ
24	WI
23	WA
22	NC
21	MA
17	LA, ME
16	MO
13	OK
12	Alberta, Canada
11	CO
10	IN, TN
9	WV
8	MN, SC
7	AL, MT, UT; Manitoba, Canada
5	NH, NV
4	AK, AR, IA, OR
3	HI, ID, KY, NE; British Columbia & Quebec, Canada
2	DE, KS, MS, Puerto Rico
1	ME, SD, VT, WY; New Brunswick & Saskatchewan, Canada; Northern Ireland; United Arab Emirates



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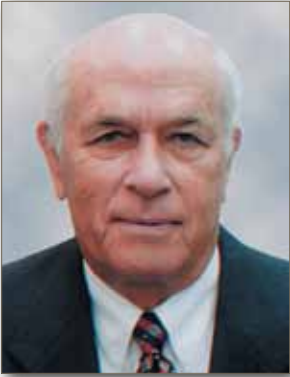
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Brad
Welding



QUALITY





Herb Whittall
EGSA Technical Advisor
HWhittall@comcast.net

Codes & Standards

Herb Daugherty and I attended the NFPA 99 – Health Care Facilities Code – meeting in New Orleans, LA in May of this year. The meeting was held to review all of the changes requested before their next issue is published. There were not many action items and some were more correlation between committees on the word to use for areas, rooms or spaces. The subject of “selective coordination” came up, but not in the usual way. Instead, Sections under 6.4.2.1.2 Selective Coordination (Type 1 EES) and Sections 6.5.2.1.1 Selective Coordination (Type 2 EES), the word “selective” has been removed. There was also discussion about easing the 2 hour fire wall requirement, but this was voted down. One idea for an NFPA research project was advanced: “How Do Hospital Systems Fail During Natural Disasters and What Additional Protections Do We Need?”

Concerning UL 2200, the proposal by Steve Sappington (Caterpillar, Inc.) of an “option to provide the marking regarding the requirements for a stationary engine generator assembly that is shipped with a partially installed or incomplete exhaust system in the instruction manual” was approved and printed by UL online (June 7, 2013). Also, the clarification of the scope of UL 2200 has been published. The second vote on the requested change to UL 2200 concerning the “Addition of accessory requirements” failed to pass.

Herb Daugherty participated in the IEEE I&CPS (Industrial and Commercial Power Systems) meeting (April 30 to May 3). This is the group that is responsible for writing the Base Book and the DOT Standards that are replacing the former IEEE Color Book Series. Progress is slow on completing work so it can be reviewed and get the Base Book and the DOT Standards published. Everyone is so busy these days it is hard to get time to do such work on the side.

EGSA is working with Office of Statewide Health Planning and Development (OSHPD) in California and others on the implementation of the IBC Seismic Standard for Hospitals there. I read their preliminary work and noticed there was nothing written concerning location of the emergency power systems in case of flooding. I asked that this be added, as the recent problems in the failure of emergency power systems during Superstorm Sandy were due to the flooding of the basements of local hospitals. Interestingly, I had

just read an article concerning a California phenomenon. Apparently, for the last 600 years there have been tremendous floods in California every 200 years during which the Central Valley and the Sacramento area were completely submerged. The last time this phenomenon occurred was in 1862. California may once again encounter such an occurrence and hospitals should be prepared for it. Actually, the third paragraph of Article 700.12 of the NEC says: “Equipment shall be designed and located so as to minimize the hazards that might cause complete failure due to flooding, fires, icing and vandalism.” A similar requirement is in NFPA 110 (2013) Article 7.1.2.

The Consumer Products Safety Commission (CPSC) has posted on their website (<http://www.cpsc.gov/en/Regulations-Laws-Standards/Voluntary-Standards/Research-Reports>) concerning work done on a prototype low CO emission portable generator set. This work is being done under their “advanced notice of proposed rule-making” and they say the report shows that existing emissions control technology can be applied to the engines that power portable generator sets to significantly reduce their CO emission levels to those that would result in fewer deaths. I interpret this to mean that in the not too distant future there will be regulations issued requiring this technology.

Herb Daugherty also attended the IEEE 1547 Meeting. The most important item to come out of the meeting was an amendment to IEEE 1547 “Standard for Interconnecting Distributed resources (DR) with Electric Power Systems (EPS). The addendum consisted of changes to 3 clauses: Clause 4.1.1 Voltage Regulation, Clause 4.2.3 Voltage and Clause 4.2.4 Frequency. It was the consensus that DR Voltage Regulation, DR Voltage ride-through and DR Frequency ride-through shall not be mandated, but shall be permitted.

ISO 8178-5 Reciprocating Internal Combustion Engines – Exhaust Emissions Measurement is being updated. The US delegate submitted a number of comments asking the committee to update the fuel specifications to reflect those currently required by the EPA. These will be addressed at the next meeting of the committee in London on July 9/10, 2013. ■

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Ready to Reach the Pinnacle? Come Scale the "Summit in Seattle" with EGSA!



September 15 - 17, 2013

Bellevue, WA

There is one thing we've found in researching Seattle, there seems to be more than a few nicknames... from the Rainy City, the Emerald City to Starbucks Central, it seems everyone has a different moniker!

Get your gear together, grab a pick or an axe and join EGSA as we carve out a nickname of our own for the "Summit in Seattle" from September 15 – 17 in Seattle (Bellevue), WA!

Bi-annually, the Communications & Conventions Committee enlists the help of our Members to come up with the next Convention/Conference theme, but this time, we ran into a challenge of sorts, as we had already announced our Executive Leadership Summit. Rather than select a competing theme, they chose to reinforce it!

Talk about reinforcement, the word Summit has two distinct meanings and this event will cover both of them! Hosted at the Hyatt Regency Bellevue, the necessary planning is almost complete. Registration will open directly after the July 4th holiday, so take advantage of Early Bird savings. **Register before August 9th and you can save \$115 per person!**

We have a lot in store for this event; we're not going to lie! **[Spoiler Alert]** Read no further if you prefer surprises, but if being "in the know" is your modus operandi, here is a snapshot of what to expect when you join us in September!

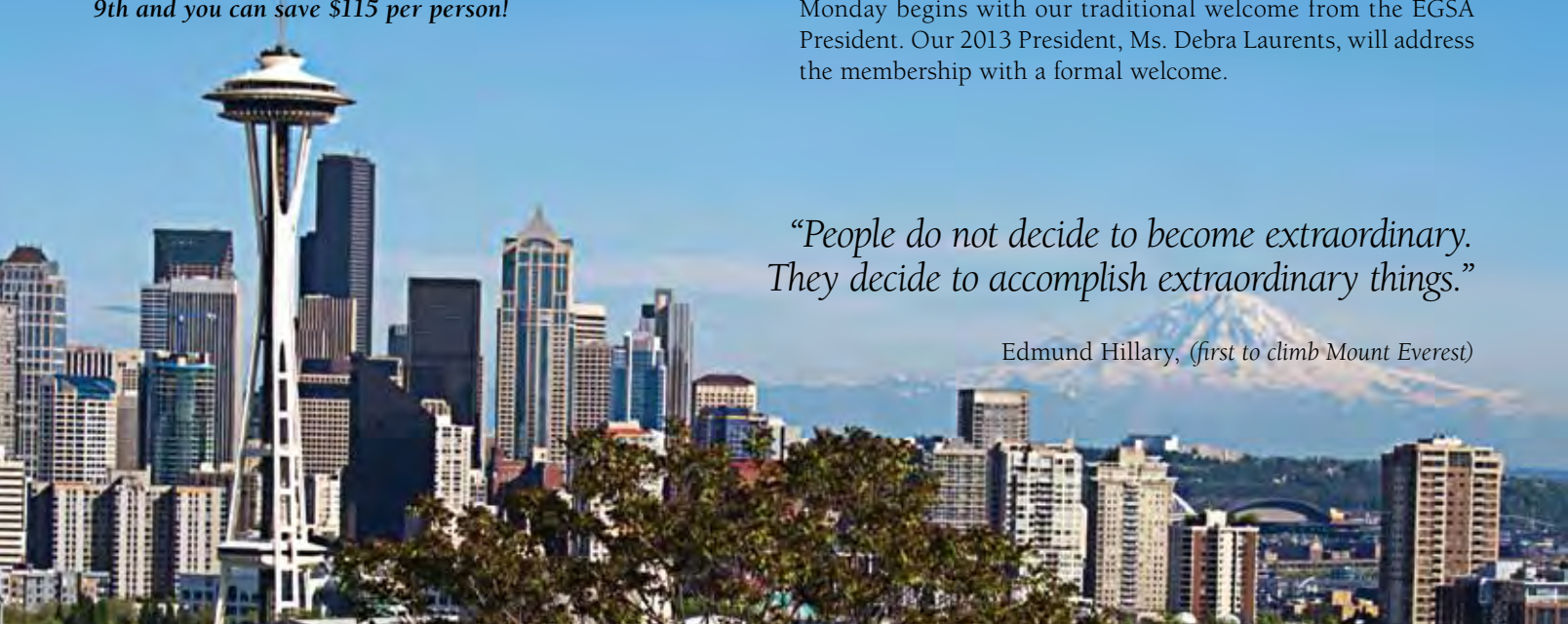
On Sunday, September 15th, plan to kickoff our 49th annual Fall Conference by joining us for the President's Reception, hosted by John Deere Power Systems. For our first timers, there is a welcoming reception just prior to the President's Reception that newcomers are exclusively invited to, so don't miss out!

As many of our active members are aware, EGSA generally hosts a slate of no more than 3 speakers during the General Sessions on Monday and Tuesday in a typical conference schedule. By scheduling the Executive Leadership Summit as the full program on Tuesday (plus our Meeting of the Members; of course), this will certainly shift focus to Tuesday morning. Keep this in mind when making your reservations; you don't want to depart Seattle before we reach the pinnacle!

Speaking of pinnacles, as always, our general session on Monday begins with our traditional welcome from the EGSA President. Our 2013 President, Ms. Debra Laurents, will address the membership with a formal welcome.

*"People do not decide to become extraordinary.
They decide to accomplish extraordinary things."*

Edmund Hillary, (first to climb Mount Everest)



EGSA 2013 Fall Technical & Marketing Conference

REGISTER TODAY! www.egsa.org/fall

sum•mit

sumh-it

Noun

The highest point of a hill or mountain.

The highest attainable level of achievement.

Synonyms

top - peak - apex - pinnacle - height

- acme - vertex



Keynote Speaker

Lieutenant
Colonel
Rob "Waldo"
Waldman

Founder and President of
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She will be followed by keynote speaker, Lt. Col. Rob "Waldo" Waldman, aka the "Wingman." A former Air Force fighter pilot, Waldo is a highly experienced combat veteran with over 2,650 flight hours and sixty-five real world combat missions.

His presentation, *Never Fly Solo*, will focus on leading with courage, building trusting partnerships and reaching new heights in business. The analogies he makes to modern day leadership, sales and management issues provide a fresh and unique perspective. Discover how to prepare diligently for every mission; employ loyal wingmen to promote integrity and mutual support; and lead your team with courage, compassion and conviction.

You will hear about how he overcame a lifelong battle with claustrophobia and a fear of heights to become a combat decorated Air Force fighter pilot and highly successful businessman, entrepreneur, and New York Times bestselling author. His motto is "Winners Never Fly Solo!"

Our second speaker on the Monday slate is John Sisson, Managing Partner of Rainmaker Associates, LLC. John works closely with CEOs & CIOs of organizations to help them translate business processes into technology in a way that drives productivity and provides real time visibility into the performance and health of an organization.

His presentation, *Leveraging CRM in the Engineering & Construction Marketplace*, looks at the business components affected by Customer Relation Management, or CRM, a type of software often used in sales environments.

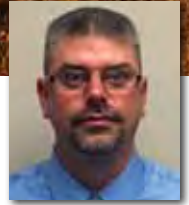
John Sisson will assist the EGSA audience with an overview of the evolution of the CRM marketplace during the past 40 years, the key components in any organization that are impacted by CRM and the fundamental differences between Cloud computing vs. On-Premises CRM application.



John D. Sisson
Managing Partner,
Rainmaker
Associates, LLC

Our final speaker on Monday, Paul Hanson, is a Sales Engineer at ComAp, LLC, an EGSA Member company since 2005. Paul will complete the speaker lineup with an industry-specific presentation on Bi-Fuel.

Paul's presentation, *Bi-Fuel Impacting North America* will detail an overview of Bi-Fuel, what it is, where it comes from and provide examples of existing systems to the EGSA audience. The presentation will also focus on the future of bi-fuel. He will also share information on the Environmental Protection Agency (EPA) and how the Tier'd emissions ratings and common practices affect the future of bi-fuel systems.



Paul Hanson
Sales Engineer,
ComAp, LLC

Mining for Gold

The City of Seattle was once a layover for prospectors on their way up to the Yukon, during the gold rush of the late 20th century. While the prospectors are long gone, this area is still filled with the pioneering spirit and an independent streak!

As any prospector worth his or her salt knows, mining for gold happens at the ground level, just as all of the great programs and plans that EGSA has developed and produced start at the Committee level. After a delicious EGSA Welcome Lunch of local fare, participate in one of our 9 formal EGSA Committees to see firsthand the great work that is happening in YOUR trade organization.

For example, several initiatives are taking shape in the Codes & Standards & Distributor/Dealer Committees. Or perhaps you'd like to have a voice in the speaker slate that EGSA presents during our events? Try the Communications & Conventions Committee! Maybe you have green industry ideas you'd like to share, then the Green Committee could use your talents and strengths! Membership, Education, Market Trends, International Trade... pick one, pick several, the EGSA Committee schedule is designed to be convenient and the expectation is that if you give our committees a try, one of them will speak to you. EGSA Members do great work each year remotely, this is one of only a handful of opportunities for our membership to work together as a group. Take advantage of it and most importantly, have a voice!

Great Local Entertainment

If music is your "thing" you may recall there was a big musical movement that took place in Seattle in the 90's (Garage music, grunge, flannel... Nirvana, Pearl Jam and the like). Well, we decided to go back a little further... to the 80's... for our entertainment on Monday evening at the EGSA Awards Reception & Banquet.

Seattle is one of those North American cities that has no shortage of musical entertainment and local 80's cover band,

Rewind, will not disappoint! Speaking of mot-tos, theirs is "Taking the Northwest back to the 80's... one show at a time." Thanks to the entertainment sponsorship by OmniMetrix, LLC, our EGSA audience should catch a glimpse of just what that means.

Power Networking – You’ve Heard of Mega Trends, Why Not Mega Fun?

On Tuesday, after our exciting Executive Leadership Summit, sign up for one of our three power networking sessions!



If hitting the links is your idea of a great networking afternoon, then the Golf Club at New-castle will not disappoint! The Coal Creek Course, designed by renowned golf course architect Robert E. Cupp in consultation with Masters Champion Fred Couples, combines characteristics of some of the game’s legendary courses to provide an exceptional playing experience round after round.

From the scenery, the greens, to the first-class amenities, enjoy the afternoon with your favorite EGSA colleagues sponsored by Platinum sponsor, Cummins Power Generation. This challenging layout features well-bunkered landing areas, rolling fairways, undulating green complexes and elevation changes... making your choice of club paramount. Like the world’s highly acclaimed courses, the Coal Creek Course offers a true test for players of all abilities.

We have talked about scaling the Summit, but what about scaling the fish? All Rivers & Saltwater Charters specializes in "hands on" fishing and the latest in boats, equipment and techniques!



SUNDAY, September 15th

10:00 a.m. - 12:00 p.m.
Registration Desk Open

12:00 - 6:00 p.m.
Exhibitor Showcase Set-up

4:00 - 6:00 p.m.
Registration Desk Open

5:00 - 6:00 p.m.
First-Time Attendees/
New Members Reception*

** This reception is by invitation only*

6:00 - 7:30 p.m.
President’s Reception

MONDAY, September 16th

7:00 - 11:45 a.m.
Registration Desk Open

7:00 - 7:30 a.m.
Exhibitor Showcase Set-up

7:30 - 8:30 a.m.
Exhibitor Showcase/Breakfast

8:30 - 8:45 a.m.
President’s Opening Remarks

8:45 - 9:45 a.m.
Opening Keynote: Never Fly Solo

9:45 - 10:15 a.m.
Exhibitor Showcase/Break

10:15 - 11:00 a.m.
Leveraging CRM in the Engineering &
Construction Marketplace

11:00 - 11:45 a.m.
Bi-Fuel Impacting North America

12:00 - 1:00 p.m.
Welcome Lunch

1:00 - 5:00 p.m.
Committee Meetings

6:30 - 10:00 p.m.
Awards Reception & Banquet

With 5 anglers per boat and led by full-time, professional guide Mark Coleman, the All Rivers & Saltwater Charters team offers private, fully-furnished Washington fishing charters for Salmon, Steelhead, Tuna, Lingcod, Halibut, Sturgeon and Crab. Sponsored by HOTSTART this Fishing charter will last 4 hours, with all gear, tackle, boat, bait, fuel, guide and transportation included.

Last but not least, we will offer the "Savor Seattle" Tour.

For networking at its finest, there’s no better

way to bond than over good food & drink (with the added benefit of walking it off)! As seen in Bon Appétit Magazine, USA Today, and Frommer’s Travel Guide, our hosts, Savor Seattle Food Tours, are ranked #1 for the best things to do in Seattle.

This walking food tour will explore exciting history, culture and food that makes Seattle a top culinary destination! We are going "behind the scenes" with fun and experienced food guides who plan to introduce our Members to Seattle’s most talented food artisans...Pacific Northwest seafood, fine wine, gourmet chocolate and much, much more!

The networking excursion will also explore how Seattle does "gourmet." Embrace upscale comfort food and F.L.O.S.S. (fresh, local, organic, seasonal and sustainable) as tour-goers will enjoy a progressive meal at Seattle’s best restaurants and hot spots. From appetizer to dessert, plan to eat your way through Belltown, downtown Seattle and Pike Place Market.

One final note on Seattle weather – It is gray and cloudy from October until July... what that means to EGSA is that there is the expectation of great weather in September, with temperatures ranging from 75 to 98, but just in case, don’t forget your layers and a rain jacket!

For more information on the upcoming Fall Marketing & Technical Conference, please visit www.egsa.org/fall. We look forward to seeing you in Seattle! ■





Executive Leadership Summit – Tuesday, September 17th



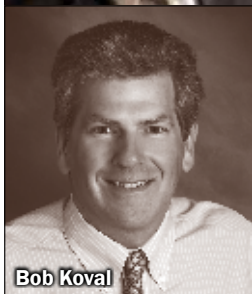
Larry Bryce, P.E.



Dennis Heathfield



Aaron Jagdfeld



Bob Koval



Matthias Vogel

The Communications & Convention Committee received a suggestion last year after our Milwaukee event from an active EGSA Member. In a nutshell, the suggestion was to host a panel discussion of senior level genset manufacturers, who would give their personal views of the On-Site Power Industry.

The concept was discussed, feelers went out, commitments were made and now, here we are much further down the path (that's right, heading to the Summit!) with an anticipation of a program very worthwhile and even historic.

EGSA formed a working group right before the Spring Convention to determine the flow of the Executive Leadership Summit (ELS). Michael Pope of Clariant Corp. signed on as Chair, Rick Morrison of Nixon Power Services, Charlie Habic of Gillette Generators, Ed Murphy of Power Search Inc., Mike Osenga of Diesel Progress (who also was tapped as moderator) and Armand Visioli of ASCO worked together to collect the questions from the members at-large and vet the questions presented by our membership.

We had great response to our Call for Questions with over 75 submitted and they have been condensed by the ELS Working Group.

Sponsored by Leroy Somer and Enercon Engineering, we will kick off the Tuesday General Session with our Meeting of the Members. The General Session will start 15 minutes early, which also means the breakfast (sponsored by Woodward) and the Exhibitor Showcase will also start 15 minutes early, so be on time," says Ed Murphy, Communications & Convention Chair and also current EGSA Vice President. "I am going to go ahead and tell our Fall Conference attendees that thanks to the generosity of HPS Loadbanks, **we will be giving away an iPad mini to one lucky conference attendee during the Meeting of Members...** it will not be a secret this time," he further declared.

Finally, the format was also determined by the ELS Working Group. We hope you will enjoy the variety!

From 8:45 to 9:45 that morning, during ELS Part 1, each of the panelists will have an opportunity to provide a 7-10 minute overview of their thoughts of the On-Site Power Industry. These presentations will be individual, and hopefully insightful as to direction and momentum for the future from our top leaders in the Industry.

When we return from the Exhibitor Showcase break at 10:15 am, all of our panelist will take the stage together and the questions gathered from our members and vetted by the

Working Group will be posed by our moderator, Mike Osenga.

Mike Osenga is President of Diesel & Gas Turbine Publications and Publisher of Diesel Progress/Diesel Progress International. In his 37 years with Diesel Progress, he has written more than 1200 feature articles on all aspects of the engine and equipment business. He was named President in 2005 and represents two of the finest trade magazines for the global engine and engine-powered equipment markets. EGSA is pleased to host such a seasoned moderator and industry veteran!

EGSA is grateful to following participants of this groundbreaking panel:

Larry Bryce, P.E. – President, Kohler Power Systems

Dennis Heathfield – Executive Director - Power Systems Business, Cummins Power Generation

Aaron Jagdfeld – President/CEO, Generac Power Systems

Bob Koval – Electric Power General Manager - Investor Projects, Caterpillar, Inc.

Matthias Vogel – Vice President, Global Sales, MTU Onsite Energy

When we asked the ESL Working Group Chair, Michael Pope, if he had anything to add, here's what he had to say, "A Power Generation Industry First! EGSA Members have a truly unique opportunity to hear the views of the most senior executives from the five largest generator set manufacturers, gathered together for the first time. The questions cover many diverse subjects and the panelists' answers will provide a fascinating insight into present and future issues faced by our Industry. I'm sure that you want to be there for this Executive Leadership Summit; it's a 'god-da-do' opportunity! Make it happen! We are looking forward to seeing you there." ■

TUESDAY, September 17th

7:15 a.m. - 12:00 p.m.
Registration Desk Open

7:15 - 8:15 a.m.
Exhibitor Showcase/Breakfast

8:15 - 8:45 a.m.
Meeting of EGSA Members

8:45 - 9:45 a.m.
Executive Leadership Summit - Part 1

9:45 - 10:15 a.m.
Exhibitor Showcase/Break

10:15 - 11:45 a.m.
Executive Leadership Summit - Part 2 - Questions from EGSA Members/ Panel Discussion

12:00 - 5:00 p.m.
Networking Events

7:00 - 8:30 p.m.
Closing Reception



Mike Osenga

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Continued from page 7

matters. In short time we had Learning Outcomes, an Author Selection process and a chapter review committee to ensure the submitted chapters were relevant, current and correct. In other words we had a professional and logical process.

George brought a similar process to the On-Site Power Generation School, with CEUs, a standard EGSA PowerPoint format and an instructor application and approval process. This was followed by third party training of all our instructors, to ensure quality and effective presentations during the schools.

The logical and clear approach that George took on all matters that crossed his desk will have a lasting legacy and has furthered the professionalism that is a core of today's EGSA. We are so fortunate to have had a person of his qualities in our organization."

2. Do you have a favorite memory of George you would like to share?

Dennis Pearson: "At the EGSA conventions, George was everywhere and helping everyone all the time. He would be assisting people at 7 a.m. with sorting some type of situation out, and finishing up at 11 p.m. with another group. George was not only the Education Director, he was the EGSA Ambassador. New members always met George, because George made it a point to welcome everyone."

Dennis Roundtree: "Well, falling in the canal in San Antonio stands out. Seriously, I think I will always remember his smile and his unflappable demeanor, even when faced with politics, multiple tasks and deadlines."

Michael Pope: "Meeting George for the first time is to discover a man who is charming, optimistic, humorous, positive and welcoming... a genuinely nice guy. After decades of smoking, he finally quit cold-turkey about a year ago – add resolve to his attributes. Considering the impact that his one-second accident has had on life, George's continuing positive attitude and sense of humor is nothing short of amazing. Example: soon after he received his new motorized wheelchair, George happened across a couple of bungee cords. Ten minutes later he drove into the busy lunchroom at his care facility – towing another patient in his manually operated wheelchair behind him, creating the best communal laugh in a long time."

3. How would you describe the way George worked with others?

Dennis Pearson: "When I first became involved in the Education Committee, Andy Ulavege, who was Chairman, had a favorite saying: 'Let George do it.' George would get involved and look at a problem or opportunity from every angle. Who might be impacted, how they may feel, how they should be approached, and in all cases, is it fair, respectful of the individual,

honest and good for EGSA and everyone involved. There were times we would discuss a situation, and George would so gently guide us (the Education Committee and me) to thinking 180 degrees from our original thoughts and somehow (magic?) convince us that it was our idea in the first place! George could have been President of a Fortune 500 company, but he blessed us with his presence. George loved education, the people, the process and the idea of helping others improve themselves."

Dennis Roundtree: "George worked with some fairly intense personalities in dealing with both the school instructors and the Committee (including myself) and he had a remarkable way of communicating expectations and keeping people grounded. He could be firm, yet mild-mannered. He understood what was realistic in working with an all-volunteer organization and was good at getting the most out of his resources."

George's colleagues have highlighted many of his contributions. I would also like to point out his instrumental role in the development of the EGSA Technician Certification Program. George established our relationship with Ferris State University, who administers the Program. He was involved in every detail, from the DACUM (Developing a Curriculum) panel to the certification patches, while working closely with the Technician Certification Committee. We had the dream; he helped to bring the dream to fruition."

Bob Breese is EGSA's new Director of Education: "My first impression of George was that he is a gentlemen, and as time went on, that didn't change. He's always distinguished and always a gentleman. In his position as Director of Education, he encouraged people's participation by actively soliciting their recommendations, and asking for their thoughts and questions. He knew a lot, but was always interested in the opinions of others. Even after his accident when I called him he was just so gracious in helping me find the information in his files. He gave me his thoughts and ideas on how he had done certain things, but reminded me that the tasks were mine now and I'm free to make changes. He's a very gracious gentleman."

We are an organization of volunteers. It is through the work and efforts of our members that we are able to grow and add value to our membership. George helped us to accomplish that, not only through his achievements, but also through his leadership, support and guidance. We all have day jobs that demand our energy and attention, thus we depend (heavily!) on the support of EGSA Staff. George's efforts helped and inspired us to continue the advancement of our education programs and bring them to new levels of excellence.

We thank you, George, for sharing your friendship and talents with us. You have our admiration and respect and we send you our prayers and good wishes. ■

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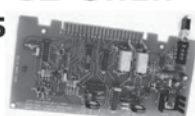


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Urea Supply Systems for Multi-Engine Selective Catalytic Reduction Systems

By Bob Stelzer, Chief Technical Officer, Safety Power, Inc.

The size of on-site power systems is continually increasing. It is not unusual to see a hospital with over 5 MW's of emergency standby power. Water pumping stations can have over 10 MW of emergency standby power and large data centers often have over 20 MW of standby power. With the low price of natural gas we are seeing large scale natural gas engines being used in Combined Heat and Power (CHP) installations. CHP plants can often be over 5 MW in size. Large on-site power installations have multi-engine installations to deal, not only with the high levels of required electrical power, but also with the need for increased reliability. Increasingly these large sites have Selective Catalytic Reduction (SCR) systems to deal with the high potential levels of NOx that are emitted when the engines are tested. The requirement for SCR's is especially relevant when the local air board looks at the worst case 1 hour average as required by the National Ambient Air Quality Standards (NAAQS). SCR systems work by injecting urea into the exhaust system to convert NOx into harmless Nitrogen and water vapor. Multi-engine SCR systems require Urea Supply Systems that must take into account unique urea liquid issues, the reliable delivery of the liquid and finally ease of use for the operators of the facility. The specialized nature of Urea Supply Systems can make it desirable for the SCR system vendor to include the Urea Supply System in his scope. As an SCR system vendor, Safety Power has done the design of many different Urea Supply Systems for multi-engine SCR installations. This article describes some of the considerations required for an effective design.

Urea Liquid Considerations

In North America, urea is usually specified as Diesel Exhaust Fluid (DEF). In Europe, urea is typically specified as Adblue. Both Adblue and DEF have urea salt dissolved in demineralized water. For DEF and Adblue, the urea concentration is 32.5% by weight. The freezing point is 12 degrees Fahrenheit or -11 degrees Celsius. While freezing does not make the urea unusable, care should be taken to avoid freezing because of damage that it can cause to piping and downstream SCR injection equipment. Other concentrations of urea are commercially available. If a concentration other than 32.5% is to be used, be sure your SCR vendor's system can be setup to use it. Avoid the use of agricultural grade urea, because it typically does not use demineralized water. Agricultural grade urea will plug urea injectors over time. DEF is available in bulk, 1100 litre totes, 205 litre drums and 22 litre pails. If the urea is to be supplied by a bulk tanker a remote fill station as described in more detail later in this article may be required.

Unlike CHP systems, on-site power systems that are used for emergency standby usually do not operate frequently. As a result, it is not unusual to see urea stored on-site for several years before requiring a refill. In one installation Safety Power has seen the urea quality change from 32.5% to over 41% as a result of evaporative losses. It is extremely important that correctly

specified breather valves be installed on the urea storage tanks. The breather valves must allow air inflow when tanks are being emptied but must ensure there are minimal evaporative losses due to the liquid's vapor pressure. Nonetheless, even with the correct breather valves, for standby emergency power applications it is inevitable that there will be urea quality changes over time due to evaporative losses. Be sure your SCR vendor has an online urea quality sensor and takes into account urea quality changes in his closed loop injection control system. It is also important that the SCR vendor provides an alarm notification when the urea quality drifts too far from specification. When such an alarm occurs it is usually due to high urea concentration. The operational fix is then to simply add demineralized water to the storage tank.

Storage Tank Considerations

Multi-engine SCR systems can have numerous different urea tank configurations depending on the available space and local operational requirements. Specifying engineers are typically requesting urea storage capacity that matches fuel capacity (in the case of liquid fuel), which is usually between 48 and 120 hours of operational capacity at full load. Regardless of tank configuration it is important for urea liquid temperature to be taken into account under cold weather conditions. If a tank is located outdoors in a cold climate it will likely require heat tracing and insulation as will any associated outdoor piping and valves. In addition the selection of tank material is important. If the tanks will not be subject to high static head pressure, High Density Polyethylene (HDPE) would be an acceptable construction material. While urea is a relatively benign substance, PVC or other materials containing chlorides should be avoided due to the harmful interaction with urea. Brass fittings or any material containing copper must be avoided. Urea quickly dissolves copper and any of its alloys. Safety Power have seen installations where the mechanical designer carefully avoided copper piping, but the instrumentation designer specified level sensors with brass components – they didn't last long.

If the tanks are subject to high static head (ie the tanks are located in a basement and the fill point is at street level) there may be a pressure concern in the event they are overfilled. For these applications stainless steel, rated for the head pressure, should be used as the tank material. Consideration must also be given to the venting strategy. Safety Power typically prefers to have the vent come out through the fill station as a failsafe in the event the level alarm is ignored by the bulk tank truck driver. It is important to check with local regulatory authorities to see if the tanks must be classified as pressure vessels and as a result may require specific ASME certification.

Large tanks or tanks installed in equipment rooms should have a means of leak detection and/or leak containment. Where there is a requirement for double-walled tanks the leak detection

should be located in the interstitial cavity. The vast majority of installations will have urea level monitoring specified. The urea level indication is often fed into the client's Building Automation System (BAS) so that the building operator can be notified when urea level is low. Where there is a separate Urea Fill Station it is important that a high level alarm is provided at the Fill Station so that the bulk tank truck driver is notified to stop the fill.

Each type of tank configuration has its associated set of advantages and trade-offs. Some of the types of configurations Safety Power has designed include:

1. One tank per SCR -

Where space and handling permits, a 1100 litre urea tote can be used in place of the permanent tank to further reduce costs. This type of installation also works well when there is not enough room for a larger common storage tank. A common approach for using one tank per SCR would be



Figure 1: Outdoor Urea Tank Heated and Insulated



Figure 2: Indoor Urea Tank

a multi-engine installation where each engine is in a pre-built outdoor enclosure. A dedicated tank can then be located close to the individual enclosure. A disadvantage with this approach is that an operator must fill multiple tanks. Also, depending on the local requirements, relatively expensive leak detection systems may be required at each small tank. Instrumentation for urea level monitoring must also be replicated in each tank, unless the operator is prepared to do a regular visual scan. An outdoor heated and insulated tank that supplies urea for

a 1.7MW enclosure mounted SCR is shown in Figure 1. An indoor urea tank that supplies urea for a 1.8MW engine is shown in Figure 2.

2. A shared tank or shared tanks -

Sometimes a single shared tank is used and sometimes 2 or more shared tanks are used. The use of multiple shared tanks allows one tank to be taken out of service with-

out affecting the entire urea supply system. The use of multiple shared tanks may also be advantageous if there is insufficient space for a single large tank.

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3. **Day tank** - If used, a day tank is typically located close to the SCR Control Panel(s). The Day Tank provides a minimum run time for urea supply in the event that a urea transfer pump fails. If a Day Tank is not used a urea supply loop provides the urea to the SCR Control Panel(s). The Day Tank will need level measuring instrumentation so that it can control a transfer pump to ensure an adequate level of urea is maintained in it. Safety Power has used Day Tanks made of HDPE or Stainless Steel – depending on the static pressure.

Urea Fill Station

Large multi-engine onsite power installations often have large urea storage requirements. Typically a large urea tank is fed through a Urea Fill Station at ground level by a bulk tanker truck. In North America



Figure 3: Urea Fill Station

the most common connection for the urea bulk truck would be through a 2" camlock fitting in the Fill Station. As mentioned before, it is important that there be a high level alarm indication in the Fill Station. Safety Power will typically vent the tank through to the Fill Station as a failsafe. If in an outdoor location the Urea Fill Station will need to be heat traced.

Be sure to pick a vendor who has experience in designing a Urea Fill Station. An example of a Fill Station installed at an existing site is shown in Figure 3.

Urea Transfer Pump Configurations

Inside each SCR Control Panel (shown in Figure 2, beside the urea tank) is an injection pump which will meter the correct amount of urea into the engine exhaust. This injection pump will typically have a limited suction head. As a result, if the urea supply tank is located relatively far away or at a lower elevation than the SCR Control Panel, it may be necessary to have a transfer pump that delivers urea from the storage tank to the SCR Control Panel. If a Day Tank is used, typically there is a gravity feed from the Day Tank to the SCR Control Panel, but nonetheless, a urea transfer pump will likely be required between the main Urea Storage Tank and the Day Tank.

Safety Power has designed many types of urea transfer systems. The following urea transfer pump configurations are the most common in our experience:

1. **No transfer pump.** Where the SCR Control Panels can be gravity fed or if the suction head is relatively small, a urea transfer pump is not required. This would typically be the case for enclosure mounted gensets. The SCR Control Panel would usually be in the enclosure and the

urea tank would be at ground level. Under these circumstances the SCR Injection pump can deal with the relatively small suction head requirements.

2. **Simplex transfer pump** - For a multi-engine SCR installation using simplex pumps there would be one transfer pump per SCR. The transfer pump would be located close to the urea storage tank. The transfer pump is sized so that it delivers the required discharge head and the necessary urea flow volume. It is important that the transfer pump be equipped with strainers that are suitable for urea service. Ensure the pump is supplied with electricity from a secure supply so that the system is functional when the facility is operating on standby power. The pump should be setup so that it only runs when the engine runs to save electricity. It is highly desirable to have a panel mounted booster pump system to save valuable floor space – for example the transfer pump controller shown in Figure 4 has the pump built into the panel making the unit compact and easy to install. It is best to pick a vendor who has experience with urea transfer systems. Often vendors who do fuel transfer systems are selected – they may not have experience with the unique attributes of urea that affect pump selection.
3. **Duplex transfer pump** - Instead of having one transfer pump per engine another approach is to have a duplex transfer pump system. In the event of failure of one of the pumps a backup pump takes over. Any installation that has more than 3 SCR systems is likely best served by a duplex transfer pump system instead of separate simplex systems. Ensure the system has pressure gauges installed on it so that maintenance staff can verify how each pump is operating.



Figure 4: Simplex Transfer Pump
(Pump is in the Panel)

In Summary

Large multiple engine installations with SCRs require an effective urea supply system. There are many possible configurations related to tankage, fill stations and transfer pumps. It is important to select a vendor with experience in urea supply systems. If the SCR system vendor has experience in urea supply systems there can be a benefit to having that vendor also handle the urea supply system – this makes one vendor responsible for the functioning of the overall system. ■

About the Author

Bob Stelzer is the Chief Technical Officer for Safety Power, Inc. He is responsible for the engineering team that developed Safety Power's ecoCUBE™ family of products. The ecoCube™ product family has been configured for over 40 different engine types from most of the world's major engine manufacturers. Bob is a mechanical engineer with a Master's degree in engineering. He can be reached at bob.stelzer@safetypower.ca.



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The Greening of Diesel Generators

By John Agnes, Customer Solutions Manager, Worldwide Power Products

For more than a decade, the Environmental Protection Agency (EPA) has been pursuing stringent emission standards for reciprocating internal combustion engines (RICE) of varying sizes in an effort to reduce the amount of hazardous emissions they release. At that same time, innovative businesses have been working to find ways to reduce the emissions produced by diesel engines. In this article, we'll discuss some of the emerging technologies that are or may soon increase the "green" quotient of existing diesel engines used to supply power for industrial and commercial sites.

Going Green

There are numerous ways to reduce the emissions of diesel engines, beyond replacing them with new, more expensive Tier 4-compliant engines. (A discussion of the EPA's Tier 4 regulations is beyond the scope and capacity of this article. We can summarize it quickly by noting that new Tier 4 engines incorporate advanced emission control technologies that will decrease exhaust emissions by more than 90 percent.) However, firms that currently operate or are considering purchasing serviceable, used pre-Tier 4 equipment can improve their environmental record in one of several ways.

Three prime methods are:

- Retrofitting diesel engines to burn a mixture of diesel fuel and a cleaner-burning fuel source such as natural gas;
- Burning an alternate fuel type that burns cleaner than 100% petroleum-based fuel;
- Employing more stringent maintenance and testing techniques.

In most cases, implementing these solutions also offers side benefits. Depending on the method chosen, benefits range from saving on fuel costs to prolonging engine life. Nevertheless, some of these solutions come with downsides that may limit their applicability in particular environments.

Bi-Fuel Takes the Stage

One of the most promising solutions WPP has identified in recent years is bi fuel (also called dual fuel, although the EPA, and therefore the industry, appears to be standardizing bi-fuel as the preferred term). Technologies of this type enable existing diesel generators to burn a mixture of natural gas—methane—and diesel with no negative effects on performance (power output or response time).

To further explore this technology, we'll use a specific example for illustrative purposes. We chose a product called OptiBlend™ from Colorado's Hythane Company, which is a subsidiary of Australia-based Eden Energy. Not all bi-fuel technologies work exactly in this fashion or produce the same results, but exploring how OptiBlend works will give you a good

idea of the value of these solutions.

OptiBlend uses a PLC (programmable logic controller) to control the delivery of methane into the air intake of a diesel generator engine. The PLC does not directly interact with the engine or its turbocharger; rather, the additional combustion energy of methane causes the engine's own OEM controller and speed control governor to reduce the amount of diesel being injected accordingly.

Up to 70% of diesel fuel can be replaced with methane in the middle of the electrical load range, and real-world implementations have demonstrated the ability to replace, on average, 50% of diesel fuel with cleaner-burning natural gas. The key emissions from a diesel generator—NOx (oxides of nitrogen) and particulate matter—are reduced by approximately 50% when running in dual fuel mode. CO₂ in the engine's exhaust is reduced by approximately 10%, as well.

Although not always a major concern for most diesel engine installations and locations, the addition of bi-fuel methane combustion may increase the exhaust emissions of CO (carbon monoxide) and HC (hydrocarbons), especially at light loads. The additional HC emissions are almost all methane, however, and most emissions regulations specify limits for non-methane hydrocarbons only.

In any case, both the CO and HC emissions can be reduced below the diesel baseline levels with a simple, passive diesel oxidation catalyst (DOC) aftertreatment device. DOC's are available off-the-shelf from a number of suppliers. As opposed to other aftertreatment devices, a DOC does not require maintenance or regeneration like diesel particulate filters, and it doesn't need any additional fluids or active controls like selective catalytic reduction (SCR) systems for NOx control, which require diesel exhaust fluid (urea solution) injection systems.

Hythane Company says there is no official pronouncement by the EPA that using bi-fuel will benefit the environment or help companies meet NESHAP (National Emissions Standards for Hazardous Air Pollutants) requirements for RICE. However,

companies wishing to demonstrate emissions reductions to the EPA—especially those located at major sources of pollution (a prime target of the latest EPA guidelines) can conduct before and after emissions tests to substantiate the benefits of using the bi fuel technology.



How the Bi-Fuel Solution Works

To achieve the greatest possible reduction in diesel fuel usage while maintaining safety and fostering long engine life, the gas infusion must be continually controlled. In the case of OptiBlend, this is accomplished with a dynamic air-fuel ratio control throttle. When the dynamic throttle and PLC are first installed, these components are "tuned" for optimal operation based on the generator's specifications and various operating conditions.

From that time forward, the PLC monitors myriad engine parameters, including engine vibration, electrical frequency and load, and exhaust gas temperature, and the system makes dynamic adjustments to the throttle accordingly. With a PLC reaction time of less than five milliseconds—and a 30-millisecond response time to fully open or close the air/fuel throttle valve—the system can respond immediately to changing demands and/or conditions.

This near-instant reaction time ensures the engine can deliver identical performance compared to running 100% diesel fuel, even in cases where the natural gas is not 100% pure methane. (OptiBlend can adjust dynamically to utilize gas intake with as little as 60% methane content.) Even impure gas from oil well heads (a primary candidate because it adds the environmental benefit of capturing a by-product that would otherwise be flared off) can be used with OptiBlend.

However, Hythane advises companies to test any sources of natural gas not delivered via pipeline before use. If major impurities such as water and sulfur are detected, the generator operator should incorporate dryers and/or sweetener skids to clean the gas before use (or risk serious corrosion and possible failure of the engine).

The use of a PLC—with no modifications made to the OEM controller—makes this bi-fuel solution an “on-off” proposition. If for any reason the operator should wish to stop incorporating gas into the fuel mixture, or if the gas supply is interrupted or any other intake fault occurs, the PLC will sense the change and adjust the throttle, and the generator set will instantaneously return to 100% diesel intake without any effect on engine operation.

Renewable-Resource-Based Fuels: A Workable Solution for Diesel Generators?

Another area of fuel technology that is sparking significant interest is renewable-resource-based fuel. The fuel type that has seen the most publicity is, of course, biodiesel, or FAME (fatty acid methyl ester) diesel. Biodiesel, which must meet the American Society for Testing and Materials (ASTM) standard D6751 to legally be sold under that name, is being created from an increasingly diverse mix of renewable resources including agricultural oils, recycled cooking oil and animal fats.

In WWP’s opinion, the broad publicity regarding biodiesel may potentially mislead companies into using it as a substitute for petroleum diesel in generators, which we do not, at this time, recommend. The National Biodiesel Board states that “Biodiesel can be operated in any diesel engine with little or no modification to the engine or the fuel system.”

However, the same FAQ notes that “biodiesel has a solvent effect that may release deposits accumulated on tank walls and pipes from previous diesel fuel storage. The release of deposits may clog filters initially and precautions should be taken.” For this and other limiting factors, including possible damage to seals and other soft parts from the solvent effect, WPP believes companies should limit the amount of biodiesel they incorporate into their fuel blend. Generator manufacturer Caterpillar has issued official recommendations regarding the use of biodiesel in non-road engines.

Even at low percentages, the use of biodiesel has demonstrated environmental benefits. For more than a decade, studies by special interest groups and governmental entities (such as the State of Minnesota) have detailed the benefits—and mechanical adaptations needed—when 20% of a generator’s petroleum diesel fuel was replaced with biodiesel.

Another alternative fuel on the horizon that sounds promising, although WPP has no experience working with it (and so cannot endorse its use at this time), is Honeywell Green Diesel™. A Honeywell subsidiary, UOP LLC, developed a refining process (Eni Ecofining™) to convert non-edible, second-generation oils and animal fats into Green Diesel.

Honeywell promotes Green Diesel as “a drop-in diesel fuel for use in any percentage in existing fuel tanks.” The firm asserts that it is chemically similar to traditional diesel and yet when burned results in lower emissions (up to an 80% reduction) compared with petroleum diesel. Perhaps more important for those familiar with the shortcomings of biodiesel, Honeywell asserts that it is superior to both petroleum diesel and biodiesel, having a much higher cetane number than either and similar or better cold flow properties, oxidative stability and energy content.

	Petro-Diesel	Biodiesel (FAME)	Green Diesel
NOx Emission	Baseline	+10	-10 to 0
Cetane	40-55	50-65	75-90
Cold Flow Properties	Baseline	Poor	Excellent
Oxidative Stability	Baseline	Poor	Excellent
Energy Content	Baseline	Lower	Similar

Chart credit: Honeywell UOP

Honeywell currently recommends Green Diesel for use in “today’s tanks, pipelines, trucks, pumps and automobiles.” At press time, the company had not specifically stated that Green Diesel was suitable for use in diesel generators (and as mentioned earlier, WPP has not evaluated it), but the technology is certainly worth evaluation.

Maintain, Maintain, Maintain

A third option for reducing emissions in existing diesel generators is thorough routine maintenance and testing. (This option can be used with option one or two, or as a standalone solution.) Generator maintenance continues to be one of the most overlooked components of generator ownership, and poorly maintained generator engines run less efficiently, which wastes fuel and often results in the release of more noxious chemicals.

Some commonly omitted maintenance routines that negatively impact the environment include:

Lack of or Inadequate Fuel and Tank Maintenance: Fuel and tank maintenance is perhaps the biggest concern regarding environmental quality. If fuel is filled with contaminants, the engine will require more fuel to operate and will operate less efficiently. (Having trashy fuel will also reduce engine life and increase the risk of engine failure.)

1. Sediment can substantially decrease the amount of usable energy in the fuel. The easiest, least costly method to rid a tank of sediment is to let it settle to the bottom of the tank and drain it. It's also possible for sediment to be caught by the fuel filter, but this will require changing the filter more often and is an imperfect approach. A clogged fuel filter also affects performance, which negatively impacts the environment. For generators operating in a dusty environment that is contributing to the sediment problem (from dirt entering the fuel tank), adding an air filter to the fuel tank breathers will also help.
2. Water that condenses in the fuel storage tank not only can corrode a diesel engine and reduce its performance and life, but it also is a breeding ground for algae, fungus and other microorganisms that clog the fuel filter and reduce operating efficiency. It's a good idea to drain and refill the fuel tank regularly—and keep fuel levels high (topped off at least quarterly)—to reduce the incidence of water. Maintenance staff should also check the fuel regularly for the presence of water in the fuel (we recommend monthly checks, as well as checks after every refuel). An insider's "secret" of the industry is Color Cut, a dipstick-style product that enables a quick check for the presence of water.
3. Microorganisms, if discovered during routine checks, must be removed with a biocide. Once the organisms are dead, it's equally important to filter the fuel in the tank to ensure the dead organisms don't clog the fuel filter.
5. Before reusing any parts, clean them with approved solvents and adhere to established cleaning and drying practices.

Effective Maintenance Scheduling Is Key

Unless companies use a dedicated maintenance scheduling and tracking tool with alerts and reminders—or have incredibly disciplined employees with great memories—they will eventually slip up on generator maintenance schedules. It does little good to incorporate these routines into a "plan" if no one is going to actually perform them. We recommend companies set up a program and put someone in charge of overseeing it or else hire a third-party provider that will. Unfortunately not only for the environment but also for ROI, maintenance is simply too important to forget.

A Greener Future

Hard-core environmentalists might suggest that these ideas are like Band-Aids on a surgical wound. Some assert that until the EPA's Tier 4 regulations are fully in effect and every grandfathered diesel generator (or engine of any sort) is retired, the "greening" of diesel isn't a story worth telling. We disagree, especially in the case of robust maintenance and the use of bi fuel technologies, both of which offer proven benefits for the environment.

Furthermore, while the greenest possible future may involve stringent emission regulations for everyone, the present reality is that many companies cannot afford to abandon their older, dirtier diesel generators, nor do they have the manpower or budget to implement the reporting requirements that come along with the new machines.

The EPA effectively agreed with this position when it released the Final Rule for 40 CFR Parts 60 and 63 (National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines; New Source Performance Standards for Stationary Internal Combustion Engines), which chose to grandfather in a very wide array of existing generators (based on their operating location).

At the end of the day, every step toward a greener diesel generator future is an important one. ■

About the Author

John Agnes oversees the rapidly growing service division of industrial power-generation equipment provider Worldwide Power Products (WPP). Prior to joining WPP, Agnes worked for more than a decade within the generator industry, spending 10 years in sales, service and management with a Caterpillar dealer and two with Simplex Onsite Services, a company that sells and rents the load banking equipment WPP uses in generator testing. Agnes holds a Bachelor of Science degree in Electrical Engineering from N.E.C. Tampa Technical Institute. He has also completed both the Caterpillar and Dale Carnegie Management training courses.

Infrequent Oil Analysis: As with fuel, oil should be as pure and clean as possible if an engine is to run efficiently and provide the best possible environmental outcome. Periodic analysis of oil (WPP recommends quarterly) is necessary to ensure the oil isn't breaking down prematurely and losing its ability to lubricate the engine and/or doesn't contain contaminants. During an oil analysis, maintenance staff should check for the presence of contaminants, metal particles, water, glycol and fuel (these items can also indicate big impending problems with the engine).

A few other overlooked items relating to maintenance and/or repair and engine performance include:

1. Ensure all openings are plugged or capped when working on the engine, even if only for a few minutes.
2. Remove any visible debris, dirt and dust from engine compartments before removing the fuel filter and other fuel system elements for maintenance or repairs.
3. Work only with reputable fuel providers that sell clean, pure fuel and only transfer fuel into the tank using approved delivery mechanisms.
4. Inspect fuel line connections between the tank and the fuel pump periodically (quarterly is best; yearly at a minimum).

EGSA Renames On-Site Power Generation Schools to Honor Former Education Director, George Rowley



GEORGE ROWLEY SCHOOL OF ON-SITE POWER GENERATION

The Electrical Generating Systems Association (EGSA) is pleased to announce that we are recognizing our colleague, Mr. George Rowley, former Education Director from 2001-2012, by renaming our Basic and Advanced School Programs in his honor.

Rowley was not only an integral part of the cultivation and advancement of the EGSA Schools, he is also responsible for extensive work on each of our EGSA education programs, from the EGSA Technician Certification Program to the David I. Coren Memorial Scholarship Program.

Our 2013 EGSA President, Debra Laurents of Cummins Power Generation, had this to say, "We will miss George's

presence at our conventions and committee meetings. Renaming the EGSA schools is a fitting way to honor his contributions to the Association. His efforts have resulted in significant growth in our educational programs, and have given us a solid foundation for taking them into the future. The Rowley School will be an important legacy not only to EGSA, but also to the On-Site Power Generation Industry."

Last September, he had this to say, "The generosity of EGSA Members has always been evident to me, with many people stepping forward and sharing resources. That initial group that assisted me grew as the years flew by. The combination of my own education skills, coupled with Members' subject matter expertise and the great teamwork and camaraderie at EGSA has enabled us to have great success with our schools, the Technician Certification Program, the Scholarship Program, the Reference Book, as well as countless other fulfilling projects."

Many may recall that Rowley had a crippling accident while on vacation in 2012 and was physically unable to continue his 11-year tenure with the trade association.

Our Education Committee Chair, Dennis Pearson, who has worked closely with George on several projects remarked, "Drinking from a fire hose is how one past instructor described the early experience of a typical student. George came in and provided professional organization to the schools, streamlined the curriculum and provided professional coaching to all the instructors for personal improvement. Thanks to George, EGSA has a first-class training program serving the On-Site Power Generation Industry. All of us on the Education Committee have recognized the continual contributions George has made to improve EGSA education. We thank you George."

"It is with great honor that from this day forward, July 1, 2013, the EGSA School Program will be known henceforth as the EGSA George Rowley School of On-Site Power Generation, and informally known as the Rowley School. Please join us in

making the transition. George touched the lives of so many and built the EGSA Education Program from the ground up, with Members from all segments of our trade association," says Jalane Kellough, EGSA Executive Director.

Headquartered in Boca Raton, Florida, the Electrical Generating Systems Association (EGSA) is the world's largest organization exclusively dedicated to the On-Site Power Generation Industry. Comprised of more than 700 companies throughout the U.S. and around the world that make, sell, distribute and use On-Site Power generation technology and equipment, EGSA encourages the exchange of ideas and information for the mutual benefit of its Members, the industry and end-users and serves as a source of information, education and training while actively promoting professionalism, communication and international cooperation. The Association is also the leading authority on recommended practices and the monitoring of performance standards for the On-Site Power Industry.

For further information, please visit www.egsa.org or call (561) 750-5575, extension 203. ■

EGSA Past President Passes at age of 95

It is with deep regret that EGSA informs you of the passing of Martin W. Bever, P.E. of Linwood, MI. Martin was an EGSA Past President (1977-78) and a committed member of the Power Generation Industry his whole life until his passing this year at 95.

Martin began his career in the late 1950's as a sales engineer for Detroit Diesel Corporation in Detroit and eventually became a partner in a DD Distributorship. In the early 1960's, he joined Michigan Cat (formerly Michigan tractor & Machinery Co.) as a one man Engine Sales operation. Over the next 20 years at Michigan Cat, he designed and sold many innovative IC engine products including re-power of on highway semi tractors (before Cat had "truck engines"), packaging of gensets from converted Cat industrial engines, and many OEM applications. In 1976, Marty was instrumental in the design and fabrication of Cat's early turbine product in a mobile application for rental service. He received his PE registration from the State of Michigan in the mid 1970's, and as Engine Division Manager, developed Michigan Cat into a multi-faceted, full service Power Systems Distributorship. He retired in the early 1980's and left a legacy that would become one of the most successful Cat Engine distributorships in North America.

His son, Michael Bever, Senior Sales Engineer at Yancey Power Systems in Austell, GA had this to say, "He was a pioneer in our industry, designing and selling gensets before Cat even made a package set. He was a PE and President of EGSA in 1977-78, and was single handedly influential in my career in our industry."

Private memorial services were held on Saturday, June 15, 2013 in Alma, MI. He will be missed by many. ■



EGSA Past President Martin Bever (left) with son, Michael.

EGSA Member Brings Game-Changing Grid Power to Mobile Generator Sets for the US Military

By Clint Crossover, Director of Sales and Contracts,
L-3 Westwood

Innovation Conversation

How productive are conversations around the water cooler? Ironically, as water cooler technology improves, so does the level of discussion that occurs around them. This was especially true for two engineers from L-3 Westwood, a supplier of power generation equipment to the U.S. military, who were having a brainstorming conversation around a water cooler. Little did the engineers know that a marketer would be eavesdropping on their water cooler conversation and make their idea a reality. That conversation – one that involved developing a means of connecting generator sets into a ring bus configuration and cycling them on and off as load demands – resulted in a new product that will save millions of gallons of fuel, and more importantly, reduce the amount of casualties on the battlefield.

With a production contract coming to an end that yielded almost 20,000 Tactical Quiet Generator Sets (TQGs) for the U.S. Army, Product Manager – Mobile Electric Power (PM-MEP), L-3 Westwood turned their attention to providing their customers with improvements to existing equipment. Currently designed for a 20-year life cycle, the TQGs are manufactured in two output sizes by L-3 Westwood to provide 30 kW and 60 kW, 120/208 V, three-phase AC power. These sets are used in a variety of roles by the military, including as a way to provide power to expeditionary camps in remote locations. The majority of these camps in the U.S. Army are managed by Project Manager – Force Sustainment Systems (PM-FSS) and are set up to house from 50 to 150 forward operating troops. Reliable power is necessary to support daily living activities, such as cooking, laundry and waste management. To maximize the efficiency of TQGs already in place, L-3 Westwood has worked in conjunction with PM-FSS for the past two years to test its Load Demand Start Stop (LDSS) system in a simulated forward operating base.

LDSS System Fuel Savings

Fuel is the most precious commodity on the battlefield. Diesel engine-driven generator sets are the largest consumers of fuel on the battlefield during wartime¹. In fact, they consume even more fuel than all the trucks, armor and personnel carriers being used. Generator sets operating as a standalone power supply are not efficient users of fuel. But, generator sets configured to operate together provide a much more fuel-efficient source of power. Imagine how much electricity would cost if everyone had to have their own power company for their home versus purchasing power collectively from the local utility and only paying for what they use. The same principal applies in Army camps. L-3's LDSS system uses smart technology to ensure soldiers get the amount of power needed without having to continually run



generator sets that consume energy and resources. L-3's LDSS system turns a group of mobile generator sets into a "utility company," providing electricity as needed, and only charging for that amount. The net result is significant fuel savings. A micro-grid of six 60 kW generator sets tested by PM-FSS has resulted in excess of 35 percent fuel savings over what was being required to provide the same amount of power at a camp.² Preliminary testing by other branches of the Army are showing results in excess of 50 percent fuel savings.

While this is the primary fuel savings associated with the LDSS system, there are other fuel savings on the battlefield as well. The amount of fuel convoys needed is proportionately reduced by the amount of fuel required to operate the generator sets. Accordingly, fuel required for convoy vehicles is reduced, as is the fuel required by equipment used in the logistics pipeline.

Compounded Benefits of the LDSS System

Perhaps the most important benefit of L-3's LDSS system is the reduction in personnel handling and transporting of fuel, as well as associated casualties. Forward operating camps are often placed in remote locations. Transporting fuel to these locations is more than a matter of loading it on a truck and driving to the site. Advance scouting is needed to clear a route and make it as safe as possible. Roadside bombing of fuel convoys is a regular occurrence. These convoys require guarding in the form of extra personnel.

In a recent visit to L-3 Westwood in Tulsa, Okla., both Sen. James Inhofe, ranking member of the Senate Armed Services Committee, and Ms. Sharon Burke, Assistant Secretary of Defense for Operational Energy Plans and Programs, made note of this.

Senator Inhofe remarked, "Advancements in defense technologies continue to decrease the level of risk our service members face while defending global U.S. interests. L-3 Westwood's Load Demand Start Stop system will reduce fuel usage by up to 50 percent, reduce overall maintenance cost, enhance combat capability and lessen combat risk of our troops overseas."

ASD Burke commented, "Talk to anybody who's been (in Iraq or Afghanistan) and they have a story about someone they know who's either been hurt or killed moving fuel, protecting the movements of fuel and clearing the routes," she said.



U.S. Sen. Jim Inhofe (R-Okla.), Ranking Member of the Senate Armed Services Committee, Ms. Sharon Burke, Assistant Secretary of Defense for Operational Energy Plans and Programs, and Clayton McClain, President of L-3 Westwood.

The event was a visit to announce a new \$13.5 Million contract for Load Demand Start Stop systems conducted April 19, 2013.

How does the LDSS System Save on Maintenance Costs?

In a traditional camp configuration, multiple generator sets run the majority of the time to ensure that power can be provided to meet the soldiers' daily needs. This often results in numerous generator sets running in different areas of the camp, with only a few providing power at the top end of their output capability, where fuel consumption is most efficient, and the rest running to meet very low-power output requirements. The majority of these sets consume fuel at a much higher gallon-to-power ratio. This results in more demand for fuel, which in turn results in increased demand for deliveries from fuel supply convoys. Also, when generator sets run at lower outputs, the fuel is not burned as efficiently and creates a problem in the industry called "wet stacking." Wet stacking occurs in diesel engines when fuel that is not burned passes through the exhaust side of the turbocharger into the exhaust system. In diesel generators, this is usually because the diesel engine is running at only a small percentage of its capacity. When this happens, maintenance on the generator sets is required more frequently.

Installation of the LDSS system allows the generator sets to be operated in a manner that reduces usage, spreads operation hours evenly across the sets in the grid, and reduces wear and tear associated with things such as wet stacking. All of these benefits result in less hours spent maintaining the sets, reducing associated parts and labor cost.

Micro-Grid Makeup

The LDSS system is a field-installable power grid management system designed to interface with the 30 kW MEP-805B and 60 kW MEP-806B TQG sets, or even a combination of the two sizes. This allows output power capability from 60 kW to 360 kW in a micro-grid. The game-changing feature of the system is that it will automatically start and stop TQGs based on electrical load requirements. The LDSS system allows as few as two and as many as six generator sets to operate on a common bus, maximizing

fuel efficiency, reducing scheduled maintenance and reducing the potential for power outages to critical equipment.

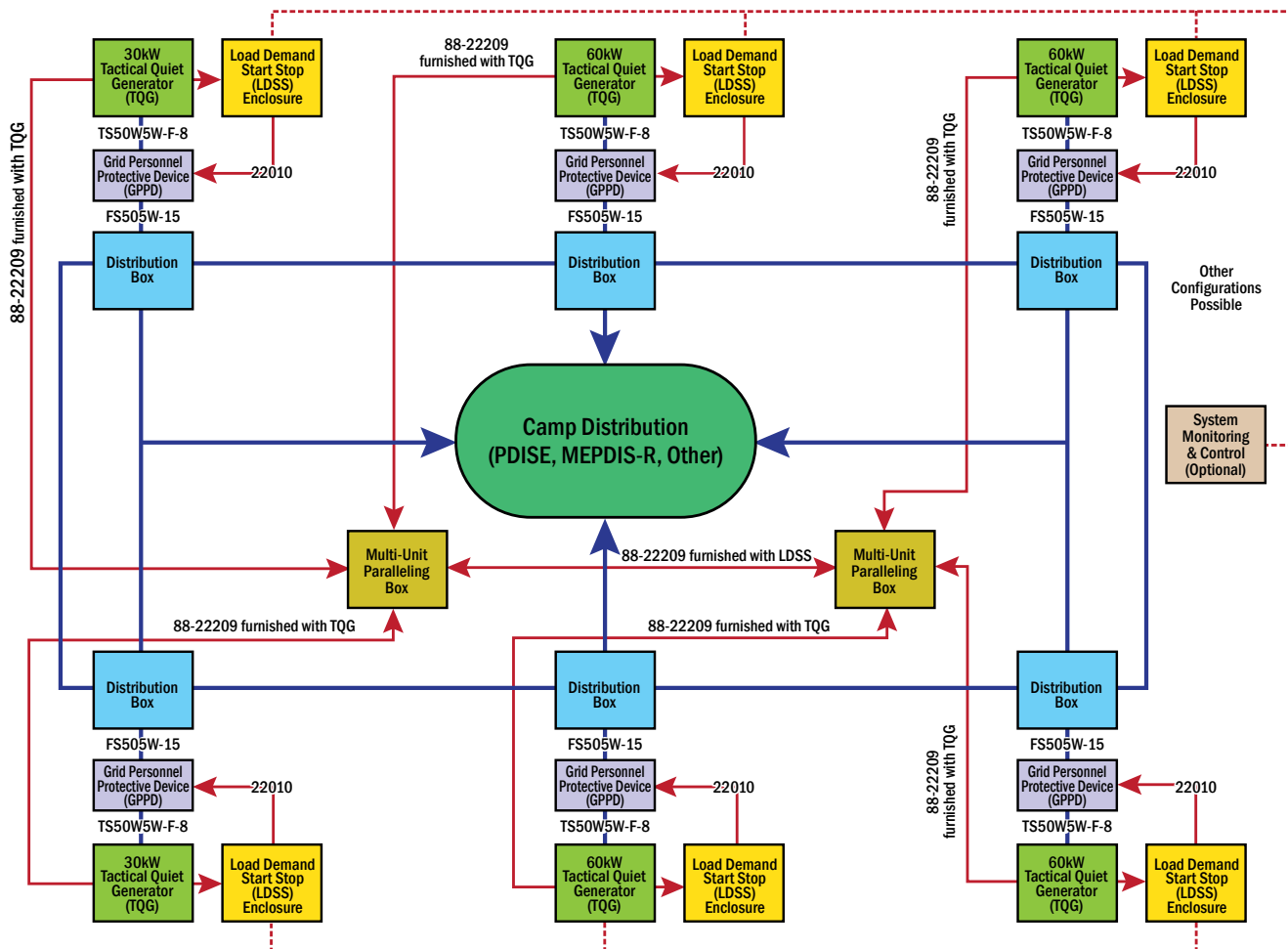
Following startup and initial loading of the first TQG, the remaining generator sets are started and stopped automatically by the LDSS system, based on overall system load. As the load increases, additional generator sets start automatically and synchronize to the bus in order to meet the increased load demand. Load is automatically shared equally between online generator sets. As load decreases, generator sets are automatically removed from the bus, cooled down, and then shut down and returned to standby status. The block diagram below illustrates the primary components of the LDSS system. These components interface with the TQGs and each other to provide a complete micro-grid.

The components are:

- **Controller** – Housed within an enclosure assembly, the digital controller is integrated into the TQG, making automatic operation of the generator sets possible. The controller can be accessed from its front-panel Human-Machine Interface (HMI), where an operator can make setting changes or display metering values dependent on level of password authority. Various pre-alarms and alarms are provided to notify the operator of the state of the equipment, ranging from a weak battery to an over-speed condition. The controller is equipped with CANbus and RS-485 communications capabilities. The CANbus link is utilized for communicating load-sharing requirements. The RS-485 utilizes Modbus protocol, offering optional monitoring and control of the controller over a polled network to a remote personal computer.
- **Powerline Communications (PLC) Adapter** – Housed within the LDSS system enclosure assembly, the PLC converts Ethernet communications from the controller into a communications protocol that is transmitted over load cables between the generator sets. The PLC eliminates the need to have additional communication wires running between generator sets.
- **Multi-Unit Paralleling (MUP) Box** – Interconnects load-sharing circuits to allow operation of more than two TQGs.
- **200A Grid Personnel Protective Device** – Provides connection capability to a common ring bus with enhanced personnel safety features. Features include the capability of isolating the generator load terminal board from the grid when the generator is not operating and the capability to isolate a generator set for maintenance activities.
- **Distribution Box** – Rugged distribution/feeder boxes, designed for outdoor use, that facilitate connection of the TQGs into a ring bus distribution system. The distribution boxes also isolate individual TQGs for maintenance.

Greater Controllability for Greater Cost Savings

The advanced controller capabilities of the LDSS system give users the flexibility to program functions of the generator sets in the micro-grid for even greater cost savings.



LDSS SYSTEM BLOCK DIAGRAM 30 kW and 60 kW Generator Sets in the Same Grid

The controller used with L-3's LDSS system provides five different management modes, allowing the user to change configuration settings to more efficiently manage the generator set sequencing as related to the site-specific load profile and/or maintenance preference.

1. In the smallest unit ID first mode, the generator sets will seek to sort the start priority in ascending order according to the sequencing ID. In this configuration, a network of generator sets will respond to a demand start request by starting the generator set with the smallest sequencing ID.
2. In the staggered service time mode, the generator sets will seek to sort the start priority in ascending order of service hours remaining. In this configuration, a network of generator sets will respond to a demand start request by starting the generator set with the least number of service hours remaining first.
3. In the balanced service time mode, the generator sets will seek to sort the start priority in ascending order of service hours remaining. In this configuration, a network of generator sets will respond to a demand start request by starting the generator set with the greatest number of service hours remaining first.
4. In the largest size first mode, the generator sets will seek

to sort the start priority in descending order of real load capacity. In this configuration, a network of generator sets will respond to a demand start request by starting the generator set with the largest load capacity first.

5. In the smallest size first mode, the generator sets will seek to sort the start priority in ascending order of real load capacity. In this configuration, a network of units will respond to a demand start request by starting the unit with the smallest load capacity first.

The ability to use different operation modes allows more efficient scheduling of routine maintenance activities, reducing maintenance man-hours and equipment downtime. Incorporation of mobile micro-grid systems in military operations will also reduce the number of generator sets required to provide power to camps, further reducing overall maintenance time.

What's Next?

As ASD Burke notes, "All of our gear requires power. It's the communications. It's the computers. It's the GPS. It's the radios." While micro-grids for mobile power generation are a major step in saving fuel, there are a number of technologies either developed or in development that will contribute to this cause.

These technologies are being explored by a number of companies and will enhance the current fuel savings of the LDSS system.

Energy Storage Units (ESUs) are another means for reducing fuel consumption. While not as effective, they provide a way to harness power from a generator set and store it, usually in a bank of batteries, and then supply the power as needed. Operation of an ESU is much quieter than a generator set and could be used to supply power for a short period of time when a camp would not want to run generator sets. ESUs can also provide what's known as "load shedding" capability. Load shedding is the deliberate switching off of electrical supply to parts of a grid. Load shedding can be required when there is an imbalance between demand and supply. While this technology is currently constrained to some degree by size, weight and safety concerns, these issues will be overcome in the near future.

Photovoltaic (solar) equipment can also reduce fuel consumption. Solar equipment, like energy storage equipment, is currently being used by the military. Solar panels are either configured and mounted on a piece of mobile equipment so that they can be deployed as part of a power supply package, or are used in a smaller design that can be rolled up when not in use, much like a sleeping bag. A drawback of solar power is that there must be sunlight to store the energy, and the space required versus power provided is much more than a generator set.

Harnessing wind power is being tested in camps as well. However, like solar, it relies on the environment and doesn't provide a great deal of power for the space required.

Wherever energy technologies are headed, the goal is to use less fuel, resulting in major savings for our military operations. There is a conscious effort within government and industry to invest in research and development in these areas for the good of all. The LDSS system demonstrates L-3 Westwood's commitment to supporting our troops and reducing overall cost in the defense budget without sacrificing readiness or safety. During his visit, Senator Inhofe commented, "L-3 Westwood's Load Demand Start Stop system will reduce fuel usage by up to 50 percent, reduce overall maintenance cost, enhance combat capability

and lessen combat risk of our troops overseas. Furthermore, at a time when our Defense Department is facing unprecedented budget cuts, this technology will be key to improving the efficiency and effectiveness of our military."

L-3 Westwood President Clayton McClain is committed to delivering innovation and affordable solutions. "We are proud that the U.S. Army has chosen to field our new LDSS system," he remarked. "The LDSS system gives us the ability to deliver even greater savings to our customers, and we will continue to research and develop new technologies for further fuel savings, including adapting the LDSS system to a variety of both commercial and military generator set power applications." ■

About the Author

Clint Crownover, Director of Sales and Contracts – Clint joined L-3 Westwood in 2000 and has held various management positions in the areas of manufacturing, sales and marketing, program management and contracts. Clint is a graduate of Rockhurst University and holds a BSBA in Business Management.



Notes:

¹ Report of the Defense Science Board Task Force on DoD Energy Strategy, Office of the Under Secretary of Defense For Acquisition, Technology, and Logistics, February 2008 For Acquisition, Technology, and Logistics.

² DoD Project Manager Mobile Electric Power Program Update to the Electrical Generating Systems Association, 2012 Spring Technical & Marketing Conference, March 2012.

"This presentation consists of L-3 Communications Corporation general capabilities information that does not contain controlled technical data as defined within the International Traffic in Arms (ITAR) Part 120.10."

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Batteries: The Go-To Building Block for a Greener Grid

By Jennifer A. Eirich, Marketing Manager, Utilities, EnerSys

Today's electric utilities are looking to energy storage to help cope with the converging stresses of increased demand, aging infrastructure and greater reliance on renewable energy resources. In energy storage, there are many chemistries and brands from which to choose. As the industry leader in energy storage, EnerSys urges utilities to consider all options. The newest and priciest battery is not always the best one for the job. The ideal solution is the one that most closely addresses the utilities' application needs. This article examines the choices that utilities face in selecting the right technology for grid optimization, from traditional lead acid to lithium ion, a relative newcomer in grid level storage. This article looks at the numerous variables that utilities must consider, with a special focus on environmental responsibility, sustainability and recyclability. It also takes a fresh look at traditional lead-acid batteries, which The Battery Council refers to as the "environmental success story of our time."

Demand and Decline

Utilities have a number of challenges to face through the next two decades. The first is increased demand. Our population continues to grow, as does our appetite for all things electronic. Therefore, despite efficiency improvements in equipment and appliances, U.S. demand for electricity is forecasted to grow by 40 percent.¹

This demand puts tremendous pressure on our domestic power grid — a complex network of power lines and substations — that, for the most part, was built back in the 1950s and '60s. A report by National Public Radio, entitled "Power Hungry: Reinventing the U.S. Power Grid," likened the grid to "a highway system — one that has been seriously neglected and is now being pushed to its limits with the demands of our growing and changing energy needs."²

The U.S. power grid is sadly outdated, lagging behind much of the rest of the industrialized world. The result is a system that is costly to repair and that will only become more expensive as time goes by. An inadequate infrastructure creates a poor business environment and puts America at a clear global disadvantage.

The aging U.S. electricity infrastructure may have been ignored, but it has not been unnoticed. Aging infrastructure was cited as the top operational concern of roughly 700 respondents in the fifth survey of strategic issues conducted by industry consultants Black & Veatch, Overland Park, Kansas. This marks the first time that aging infrastructure was the top operational concern identified in this survey. Reliability, regulation, technology and environmental issues closely followed aging infrastructure as the top operational concerns facing U.S. electric utilities.³

The combination of increasing demand and declining infrastructure results in power interruptions, including voltage sags, brownouts, overvoltage conditions and power outages. More than just an inconvenience, they shut down manufacturing plants, close restaurants, darken streetlights and hinder emergency services.

The cost of these power interruptions is high. An EPRI study from 2005 suggests that the cost to North American industry of production stoppages caused by voltage sags now exceeds \$25 bil-

lion per year.¹ In 2012, the U.S. Department of Energy estimated that this figure was as high as \$80 billion per year.⁴

Perhaps most disturbing is how much worse the problem is in the United States compared to other countries. According to researchers at Carnegie Mellon University, the average U.S. electricity consumer experiences an average of 214 minutes without power each year. This compares to just 21 minutes in Germany and a scant six minutes a year in Japan.⁴

Adding Renewables to the Mix

While utilities are struggling to cope with the inadequacies of an aging infrastructure, they are also striving to incorporate new, greener technologies with the increasing use of renewable energy sources.

The share of electricity coming from renewable sources of electricity is projected to grow from 10 percent in 2012 to 16 percent in 2035.⁵

The International Energy Agency predicts solar generators may produce the majority of the world's power within 50 years, slashing the emissions of greenhouse gases that harm the environment. Photovoltaic and solar-thermal plants may meet most of the world's demand for electricity by 2060 — and half of all energy needs.⁶

Meanwhile, wind power is growing at the rate of 30% annually, with a worldwide installed capacity of 282,482 megawatts (MW) at the end of 2012.⁷

Intermittencies are an inherent challenge in these renewable resources. Solar radiation is, of course, zero at night, and affected by cloud cover during the day.

Wind energy also varies according to weather systems passing over a given location, with recurrence times typically between one and three weeks. Even hydropower is generally stable, but varies seasonally as dictated by the components of the water balance, including precipitation.

A Case for Energy Storage

According to The National Renewable Energy Laboratory, electric utilities already are among the largest owners and users of electrochemical battery systems.⁸ All three challenges — increased demand, aging infrastructure and the growing reliance on renewable energy resources — make the case for adding energy storage. In Black & Veatch's seventh annual U.S. electric utility industry report, 54 percent of those surveyed said more energy storage is needed to integrate renewables into the grid.⁹

Frost and Sullivan's research goes so far as to predict that "electric energy storage technologies will be an inseparable part of smart grids and distributed energy generating systems in the future."¹⁰

The benefits of energy storage are numerous and diverse. Energy storage augments conventional power generation, providing immediate, ready-to-use power. As such, it offers management flexibility and helps to save costs for both the utility and its customers by balancing supply and demand while improving response time, power quality, reliability and efficiency. Energy storage also helps utilities to meet federal and state regulations, integrate renewables and lower

emissions. In addition, it reduces the need for upgrades and expansion and may even lead to the retirement of older generation plants by maximizing existing transmission and distribution (T&D).¹¹

Today, lead acid and nickel-based batteries currently dominate the utility-scale storage industry, with lithium ion becoming increasingly popular.

Choosing the Right Storage Chemistry

With so many different chemistries and brands available, it's hard to know which is the right one for the application at hand. There are as many as 11 variables that may be included in the decision of what battery type to select for a given system.¹²

Many of these variables are related to balancing performance versus cost. Cost may be looked at several ways, from comparing initial purchase price to costs for maintenance, engineering, disposal and shipping. Lead acid is a fraction of the initial cost (\$/kWh) of the more energy-dense lithium ion and is hailed as "the most efficient technology" by The Battery Council. However, an equal capacity of lead acid is heavier and bulkier, and therefore, and a bit more expensive to ship and install.

In terms of performance, lithium-ion has significantly higher cycle life than lead acid in deep discharge applications. The disparity is further increased as ambient temperatures increase. The cycle life of each chemistry can be increased by limiting the depth of discharge (DoD), discharge rate, and temperature, but lead acid is generally much more sensitive to each of these factors. However, if space allows for the larger footprint, lead acid offers a comparable, cost-saving alternative.

Safety and reliability are also key concerns. Lead acid has been around for over 100 years and has a longer track record in safety and reliability than other rechargeable battery technologies, according to The Battery Council. While both technologies are capable of going into "thermal runaway," the likelihood and consequences of an event are higher for lithium-ion as it has a higher amount of energy in a smaller volume. Utilities can add an extra layer of protection by monitoring individual cells instead of lines of cells. This is standard in some utility-scale storage systems, but not all and is an important concern to share with the system supplier/integrator.

Being Green

Beyond cost, performance, safety and reliability, there are a number of other variables that are becoming increasingly important to environmentally conscious utilities. These include environmental impact, sustainability and recyclability. Black & Veatch's "The 2013 Strategic Directions in the U.S. Electric Industry Report" revealed that utility leaders were concerned about reliability issues as well as environmental issues.⁹

There are several stages in the lifecycle of a battery that impact the environment — mining, disposal/recycling and use/re-use of raw materials.

Mining

Lead acid batteries require many times more raw material than lithium-ion to achieve the same energy storage, making a much larger impact on the environment during the mining process.¹³ This is offset by its recyclability, as discussed below.

The major components of a lithium-ion cell require the mining of lithium carbonate, copper, aluminum, and iron ore. Lithium

mining specifically is resource intensive, but lithium is only a minor portion of the battery cell by mass, so the aluminum and copper environmental impacts are much more significant.

Disposal/Recycling

When a battery is purchased, the owner is liable for its proper disposition. If that battery is dumped in a landfill or shipped to a scrap dealer that does not handle it properly, the owner may still be responsible for any resulting cleanup costs or environmental damage. For this reason, it is important to ensure the proper disposal/recycling of all battery products.

When recycling primary lithium batteries, improper disposal can be catastrophic. The metallic lithium reacts when in contact with moisture. If it is disposed of in the landfill in a charged state, heavy equipment operating on top could crush the cases and the exposed lithium could cause an underground fire that would be difficult to extinguish. Before recycling, be sure to apply a full discharge to consume the lithium content. Some of major recyclers are active in recycling spent batteries. One company uses liquid nitrogen to freeze lithium-based batteries before shredding, crushing and removal of the lithium, as well as other battery components. The lithium is dissolved in a solution to make the metal non-reactive and is sold for producing lubricating greases. Similarly, the cobalt is separated, collected and sold.

Unfortunately, recycling lithium batteries is not particularly cost effective, which discourages many from recycling. The retrieved raw material barely pays for labor, which includes collection, transport, sorting into batteries chemistries, shredding, separation of metallic and non-metallic materials, neutralizing hazardous substances, smelting, and purifying the recovered metals.¹³

Lead-acid batteries are essentially 100% recyclable, and, over 97 percent of lead acid batteries in the United States are recycled, which makes a huge impact on the environment. The lead-acid battery gains its environmental edge from its closed-loop life cycle. The typical new lead-acid battery contains 60 to 80 percent recycled lead and plastic. During the recycling process, the battery is separated into three distinct components. The lead is smelted and refined for use in new batteries. The plastic case is recovered and its material cleaned and molded into new battery cases. The used acid is even recycled for reuse. The recycling process is simple and 70 percent of the battery's weight is reusable lead. As a result, over 50 percent of the lead supply comes from recycled batteries.^{13,15}

Benefits of Recycling

As shown, utilities that actively participate in recycling avoid serious liability issues and also help to minimize industry raw material costs. Recycling also contributes to the protection of our earth in the following ways:

Recycling saves natural resources by reducing the need to drill for oil and drill dig for minerals. For example, four percent of U.S. annual oil consumption, or roughly 219 million barrels of oil, goes into the manufacture of plastic. Increasing the amount of plastic recycled can make a significant impact on oil use.¹⁶

Recycling saves energy. In general, recycling saves three to five times the energy generated by waste-to-energy plants, even without counting the wasted energy in the burned materials.¹⁷ In terms of batteries, it takes significantly less energy to make a recycled battery. Secondary lead bullion, for example, requires four times less

energy to make than primary lead.¹⁸

Recycling saves clean air and water. In most cases, making products from recycled materials creates less air pollution and water pollution than making products from virgin materials. Some products like plastic and lead are difficult to scrap and their toxic components create pollution in the environment that is harmful to human health. Recycling lead batteries reduces this problem, as there is no need to destroy the scrap; it is used for another round instead.¹⁹

Recycling saves landfill space. When recycled materials are incorporated into new products instead of landfills or incinerators, landfill space is conserved and hazardous materials are disposed of properly.

Finally, recycling saves money and creates jobs. The recycling industry and the associated processes create far more jobs than landfill sites or waste incinerators. It has been estimated that recycling, re-use, and composting create six to ten times as many jobs as waste incineration and landfill.¹⁷ Jobs created by recycling cover a wide variety of skill sets, including basic labor, manufacturing, entrepreneurship, advanced science and engineering. Recycling creates new “green” technologies designed to take advantage of the reclaimed resources. In fact, the National Recycling Coalition reports that recycling has created 1.1 million jobs, \$236 billion in gross annual sales, and \$37 billion in annual payroll.¹⁶

Technology					
Property	Lead Acid	Ni-Cd	Ni-MH	Li-Ion	Li Polymer
Energy Density Wh/kg	40	50	80	125	110
Energy Density Wh/l	100	120	300	300	250
Cycle Life	800	1000	500	600	600
Power Density W/kg	400	300	300	300	100
Relative Cost Wh/\$ (100=Best)	100	40	25	20	15
Recycling Rating (100=Best)	100	60	20	10	10
Safety Rating (100=Best)	100	60	65	20	20

Figure 1 – Attribute Comparison of Advanced Electrochemical Energy Storage Technologies

Conclusion

According to Black & Veatch’s recent industry report, almost 44 percent of respondents said they would be making investments this year in generation, transmission and distribution to ensure reliability, compared to 45 percent in 2012.⁹ For many, this will include an investment in utility-scale energy storage.

Lithium-ion is a well-established technology for portable electronics but is still finding its role in larger scale applications; it is emerging as a contender in certain stationary applications where volume, weight, temperature sensitivity or low maintenance is more important than initial cost.

Lead acid, however, has been around for over 100 years and will continue to be a market force for the foreseeable future due to its low cost, established manufacturing base and almost 100% recyclability. According to The Battery Council, lead safety efforts by the battery industry have led to the adoption of battery recycling laws in 38 states while five others have disposal bans. While it may seem contradictory to recommend a lead-acid solution to a utility seeking to enhance its environmentally friendly profile, lead acid systems offer excellent performance, efficiency, flexibility and, best of all, recyclability. Unlike lithium, lead acid batteries are 100% recyclable — a huge benefit to a utility striving to enhance its energy friendly profile. ■

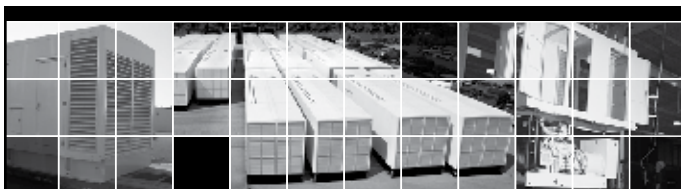
About the Author

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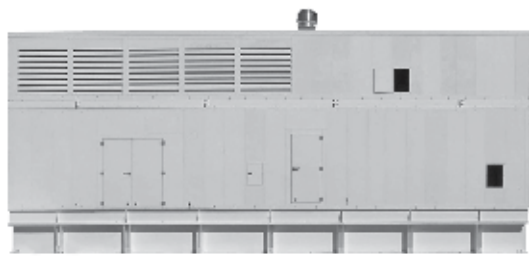


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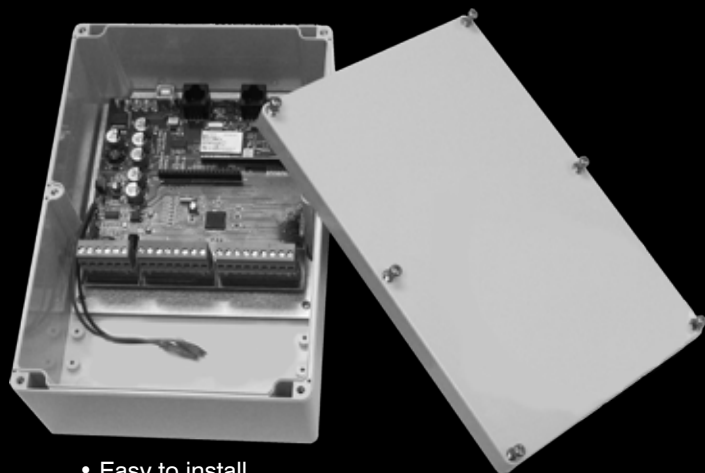
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Emergency Back Up Power Readiness

By Ananth Parameswaran Director - Power Systems and Global Marketing , Cummins Power Generation

On-site backup power provides a reliable and cost-effective way to mitigate the risk of economic loss and societal hardship from power outages. Many businesses suffer economic losses due to disruptions of electric power supply during a natural disaster. For businesses with highly sensitive loads such as datacenters and financial institutions, the risk of economic losses from downtime due to power disruption is high. For many facilities, there is the life safety aspect to consider, such as in assisted living facilities and nursing homes. Other facilities such as cell tower sites, emergency call centers and gas stations have far reaching social impact and their availability is critical in recovering from a natural disaster or an act of vandalism. These facilities should invest in on-site back-up power equipment to ensure required levels of reliability, safety, productivity and uptime.

Backup Power System: Brief Overview

On-site backup systems use local generation at the facility site to provide power when the utility is not available. The backup power system may or may not be interconnected with the utility grid. On-site electrical power generating systems are readily available in a wide variety of designs for specific uses and specific customer applications. The typical on-site power system consists of a power source and a means to transfer power from that source to the load when an outage occurs. Remote monitoring and control systems that allow an operator to check the system status and operate the system remotely are becoming more commonplace. The Generator's primary mover can be of different types of fuel source such as Natural Gas, Propane and Diesel fuels.

Fuel Selection

The selection of natural gas (NG), diesel, or LPG should be made based on the application's characteristics and requirements. Considerations for choosing amongst the different types include:

- **Initial cost of equipment and installation:** Diesel generators are relatively more compact and produce higher power output for the same size of NG.
- **Fuel costs:** These will depend on the specific area in which the equipment is being installed. Exact cost figures should be combined with specific fuel consumption figures to do a comparison across options.
- **Fuel availability:** Depending on the region, fuel availability will play a much bigger role. Gasoline is not a suitable fuel for stationary standby generator sets due to volatility and shelf life. With NG, no on-site fuel storage is required for most sites when NG infrastructure and

pipework are available at point of installation. However the majority of large NG genset sites will require a locally stored LP backup. While diesel can be easily transported and stored, care must be taken during storage to prevent deterioration of fuel quality. Diesel fuel lasts up to two years in storage, so the supply tank should be sized to allow for fuel turnover based on scheduled exercise and testing in that time period.

- **Start Up time:** Diesel engines usually have much faster starting times than NG or other fuel types. For required backup power in under 10 seconds, Diesel Generators are the preferred option.
- **Cost:** Diesel engines usually have higher power density than spark ignited engines. Hence diesel powered generators are more cost-effective than NG powered generators for same power output.



Diesel generators for emergency power can be located inside the building in a dedicated power room, or outside the building in weatherproof enclosures.

Typically, diesel-powered generators provide the most reliable form of backup power due to fuel availability, power density, and ability to ramp up quickly.

The following section will address design and maintenance considerations for these systems in more detail.

Design considerations for diesel on-site generator systems

Designing a generator set installation requires consideration of equipment and application requirements. These vary depending on the reasons for having the generator set and its intended use. Reviewing and understanding these reasons is an appropriate starting point for the system design and equipment choices. No single solution meets all needs. Before configuring a system, facility managers must consider the intended use of the generator set

and a number of other factors, including:

General Requirements

Consideration for mandatory installations (due to code requirements) for emergency power along with voluntary installations of standby power (to mitigate the risk of loss of services, data, or other valuable assets) may utilize one system for both of these general needs, provided that life safety needs have priority.

Load Specific Requirements

A wide range of specific requirements will result in the need for on-site electric generation systems which tend to vary by application type. Some common installations are listed here:

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- **Healthcare:** Standby power is required for all life-safety systems which includes evacuation/egress lighting, HVAC systems for patient care and operating rooms, critical process equipment such as medical imaging devices and fire suppression equipment to aid response teams in the event of an emergency.
- **Data Centers:** The servers housed in data centers (both large and small) drive our economies and the financial health of businesses and households. Without a backup power system to these loads, the loss of data could cause a global catastrophe. Apart from the data held in these facilities, the cooling equipment required to maintain their operation must be kept online in order for the digital equipment to work properly.
- **Communications:** From cellular towers to 911 call centers, the driving force to an efficient emergency response is communication. Without power to the transmitters and receivers, the recovery process is significantly delayed and large losses in resources are seen due to inefficient allocation.
- **Commercial/Residential Properties:** Ambient lighting, temperature control, and the PCs that most of us rely on for everyday work all depend on sustained power quality in order to operate. Without electricity, even the most mundane common day tasks become points of concern. This can extend from sending an email at work to keeping food cold in the refrigerator.

Location

One of the first design decisions will be to determine whether the location of the generator set will be inside a building or outside in a shelter or housing. The overall cost and ease of installation of the power system depend upon the layout and physical location of all elements of the system – generator set, fuel tanks, ventilation ducts and louvers, accessories, etc. For both indoor and outdoor locations, key considerations include:

- Generator set mounting, noise and emissions regulations
- Location of distribution switchboard and transfer switches
- Containment of accidentally spilled or leaked fuel and coolant
- Service access for general maintenance and inspections
- Access and working space for major work such as overhauls or component removal/replacement
- Access for load bank testing when required for maintenance or scheduled exercise.

It is critical to recognize and take into account all these factors while designing the system and think through possible disruptions due to an emergency event or natural disaster. The systems components need to be designed for security from flooding, fire, icing, wind and snow. For example, during Hurricane Sandy, some facilities experienced disruption in back up power due to the diesel fuel pumps being flooded. This could have been avoided by locating the fuel pumps in a different location to the fuel storage tanks.

Generator Ratings

On-site power generation systems can be classified by type and generating equipment rating. The generating equipment is rated using standby, prime, and continuous ratings. The ratings definitions are important to understand when applying the equipment and depend on the intended use of the equipment. Power ratings for diesel generator sets are published by the manufacturers in accordance with ISO 8528. These ratings describe maximum allowable loading conditions on a generator set. The generator set will provide acceptable performance and life (time between overhauls) when applied according to the published ratings. It is also important to operate generator sets at a sufficient minimum load to achieve normal temperatures and properly burn fuel.

Environmental Considerations

The most critical environmental issues are those related to noise, exhaust emissions, and fuel storage. Emissions are a complex topic, and should be taken into consideration at the early stages of backup power decision making. The EPA defines “stationary emergency applications” as those in which the generator set operates only during periods of an outage of the normal utility power supply (with the exception of limited-duration operation for testing and maintenance). All other uses, such as prime power, rate curtailment and storm avoidance constitute non-emergency use. While the EPA does not impose a limit on the number of hours that a generator may operate in emergency situations, the EPA does limit operators to run their emergency generator sets 100 hours per year for maintenance and exercise purposes.

Storm avoidance is an effective tool for operators to mitigate potential risks of incoming storms, rolling blackouts or other unforeseen natural disasters. Only generator sets that are EPA Tier 4i-certified are permitted to operate with no limits for such circumstances. Those seeking best available technology or lowest emissions possible may opt for an EPA Tier 4F compliant (which is Tier4i-certified) generator set.

Maintenance and Readiness Recommendations

Preventive maintenance for diesel engine generators plays a critical role in maximizing reliability, minimizing repairs and reducing long term costs. Because of the durability of diesel engines, most maintenance is preventive in nature. By following generally recognized generator maintenance procedures and specific manufacturer recommendations for the application, facilities will be assured that the backup power system will start and run when needed most. It is generally a good idea to establish and adhere to a schedule of maintenance and service based on the specific power application and the severity of the environment. The following areas should be inspected frequently to maintain safe and reliable operation: Exhaust system, Fuel system, DC electrical system and the Engine.

Lack of adherence to a preventative maintenance schedule is one of the leading causes of failure to start of a backup power system. When preparing for an emergency, one should pay particular attention to the Starting batteries. Weak or undercharged

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starting batteries are the most common cause of standby power system failures. Even when kept fully charged and maintained, lead-acid starting batteries are subject to deterioration over time and must be periodically replaced when they no longer hold a proper charge. Only a regular schedule of inspection and testing under load can prevent generator starting problems. Merely checking the output voltage of the batteries is not indicative of their ability to deliver adequate starting power. As batteries age, their internal resistance to current flow increases, and the only accurate measure of terminal voltage must be done under load.

Generator sets on standby must be able to go from a cold start to being fully operational in a matter of seconds. This can impose a severe burden on engine parts. However, regular exercising keeps engine parts lubricated, prevents oxidation of electrical contacts, uses up fuel before it deteriorates, and, in general, helps provide reliable engine starting. Exercise the generator set at least once a month for a minimum of 30 minutes loaded to no less than one-third of the nameplate rating. Periods of no-load operation should be held to a minimum, because unburned fuel tends to accumulate in the exhaust system. If connecting to the normal load is not convenient for test purposes, the best engine performance and longevity will be obtained by connecting it to a load bank of at least one-third the nameplate rating.

Next Steps and Recommendations

To ensure continuity of critical services and protect critical facilities from power outages, facility owners and operators should follow these recommendations:

Evaluate and mitigate the risk

Identifying the facility's critical loads is an important first step. Understand the social risks and costs of a facility shutdown. Accordingly invest in a backup power system or make arrangements for temporary rental power.

Design for Emergencies

Work with a power generation firm that can help you understand what your backup power needs would be to ensure optimal selection of a backup power system that is designed for emergency conditions. Depending on needs, develop a plan that includes a rental agreement with that company before or after a disaster.

Ensure sufficient fuel storage and supply

Have emergency generator fuel on hand to allow at least 48 hours of operation, or as required by code (for example, some healthcare facilities require 96 hours), and develop contracts with fuel operators for restocking.

Ensure Scheduled Exercise and Maintenance

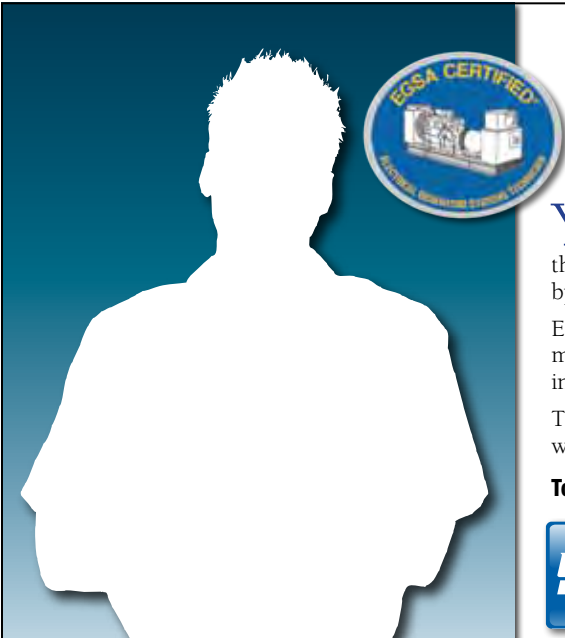
Generators should be "exercised" periodically to ensure they will operate as designed in the event of an emergency. Preventive maintenance plays a critical role in maximizing reliability, minimizing repairs and reducing long term costs. Follow generally recognized diesel maintenance procedures and specific manufacturer recommendations for your application.

Ensure Trained Personnel: Staff need to be trained to maintain and operate the generator unit and should be ready to be deployed as needed. ■

About the Author

Ananth Parameswaran is a leading global authority on distributed power generation. He is Director—Power Systems and Global Marketing at Cummins Power Generation. In this role, he has global responsibility for marketing and product planning for integrated power systems, power distribution and power plants. Prior to Cummins, Ananth was an entrepreneur in India and also worked with the Tata Group. He has a Bachelor's Degree in Mechanical Engineering from the College of Engineering, Pune and an MBA from Harvard University.





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Your power generation system is a complex, sensitive and expensive investment. It requires an expert to install it, monitor its operation and maintain it. Now, more than ever, ensure the equipment that you specify is installed, serviced and maintained by an EGSA-Certified Electrical Generator Systems Technician.

EGSA is a non-profit association poised to help people and organizations just like yours meet the ever-increasing business demands for emergency power solutions while balancing those demands with cost, safety, security and emerging technologies.



The EGSA certification is the industry benchmark that provides you with an objective way to gauge whether someone is qualified to work on your system.

To learn more about EGSA and our Technician Certification Program visit www.egsa.org.



Electrical Generating Systems Association (EGSA)

(561) 750-5575 e-mail@EGSA.org

MIRATECH

Another in Our Series of EGSA Member Company Profiles

MIRATECH

www.miratechcorp.com

...is a leading provider of innovative emission solutions for users of industrial reciprocating engines worldwide. Founded in late 1992 as a technical sales and marketing company of NSCR catalysts and air/fuel ratio controls, it has since expanded to include the engineering, design and production of NSCR, SCR, and DPF catalyst systems, silencers, field service, catalyst cleaning and replacement, training and turnkey project management to support its customers in North and South America. The company is centrally located in Tulsa, Oklahoma and has sales offices scattered in the US with independent representatives and distributors in the Western Hemisphere.



As MIRATECH grew during the 1990s, the company concentrated its expertise on system solutions. This focus led to the development of a multi-disciplinary competency that covers a broad spectrum of engine combustion and control; exhaust flows and mechanics; catalytic chemistry; steel structural and manufacturing engineering; exhaust acoustics; project economics; and emission regulations. The currently enacted RICE NESHAP regulations, in particular, have made MIRATECH a 'go to' company for engine users seeking to be in compliance.

Along the way, MIRATECH greatly expanded its product line from proprietary Non-Selective Catalytic Reduction (NSCR) catalytic converters and today offers its customers a broad selection of air/fuel ratio controls for natural gas-fueled engines, Selective Catalytic Reduction (SCR) NOx reduction technologies, Diesel Particulate Filter (DPF) products, control systems for natural gas and diesel engines and the latest technology in acoustic silencing.

Markets served by MIRATECH include power generation, gas compression, water and other liquid pumping, bio-gas and

green house CO₂ augmentation, as well as locomotive and industrial marine engine applications. While the company historically focused on these markets in the US and Canada, it recently expanded its reach into South America, the Caribbean, Europe, Asia, Australia, the Middle East and North Africa.

Sales are directed and completed through a direct sales force, independent representatives and distributors. Currently, MIRATECH is comprised of approximately 50 employees with offices in Tulsa, OK; Houston and Dallas, TX; Los Angeles, CA; Chicago, IL; and Philadelphia, PA. Independent MIRATECH representatives have offices in Denver, CO; Los Angeles and Napa, CA; Portland, OR; Minneapolis, MN; Racine, WI; Kansas City, KS; Lafayette, LA; Philadelphia and Pittsburgh, PA; Atlanta, GA; Lima, Peru; Santiago, Chile; and San Luis Potosi, Mexico.

At the core of the MIRATECH business model is the concern for life and health issues of people, animals and crops affected by engine exhaust emissions. Regulations such as the National Ambient Air Quality Standards (NAAQS) along with the Envi-

ronmental Protection Agency (EPA) and other regulators at the state/province and local levels drive the company's products and services. In addition, public concern over global warming may bring even more regulations in the future and lead to the development of products that are not yet on the drawing board. For example, more than 400 counties in the United States currently do not meet federal ozone standards; several countries in Europe do not meet EU NO_x levels and globally there is growing concern about particulate matter from diesel exhaust.

In the past, now and in the future, the MIRATECH main focus is on cleaning the air we breathe by creating products that decrease regulated air pollutants found in engine exhaust. To achieve this, MIRATECH continues to invest in product development and service offerings to support its customers.

Products

The MIRATECH original product line included Non-Selective Catalytic Reduction (NSCR), catalytic converters. Simply put, these devices promote catalyzed chemical reactions that convert pollutants to neutral by-products like carbon dioxide (CO₂), water (H₂O) and nitrogen (N₂). Over the years, MIRATECH expanded its product line to include electronic controls for natural gas engines, Selective Catalytic Reduction (SCR) technologies and controls, acoustic silencing, and diesel particulate filter (DPF) products. These products are used on both natural gas and diesel engines in industrial applications where the engine power range is from 50 to more than 20,000 horsepower.

Diesel Particulate Filters (DPF) are available for diesel engines used in power generation, workboat and locomotive applications. MIRATECH offers a CARB Level III+ DPF system for stationary diesel gensets, and will soon offer a new, more technically advanced DPF system combined with silencer options.

A patented converter, the V-Catalyst, for EMD engines passed rigorous testing at MIRATECH, Southwest Research and in field demonstration projects. It is now exclusively sold through EMD as an OEM-approved emission solution. The V-Catalyst is certified by the EPA as an approved marine 1042 kit and is verified by CARB for diesel genset applications.

Catalytic Converters

MIRATECH has its own designs for natural gas and diesel engine catalytic converters, most with integrated silencing. As a result of the rigors of design, validation and verification of the engineered and manufactured project, MIRATECH secured product patents for many of the catalyst element and housing designs. The catalytic converter housing fabrication is done in Tulsa.



Electronic Controls

Proper electronic control of fuel and air mixtures for natural gas engines provides better power and load following, improved fuel economy, and in some cases reduced maintenance for engine operators. MIRATECH has been the technology innovator from the company's inception and still provides state-of-the-art controllers to the industry. Additional controls include urea or ammonia injection control for SCR catalysts, DPF monitors,

NESHAP catalyst monitors and dual fuel controls with natural gas to reduce operating fuel cost. All these controls lead to maximum pollutant reduction by catalytic converters.

Technical Service, Product and Project Management

MIRATECH has always provided service after the sale as part of its solutions mindset while continuing to expand its activities in many ways with product life cycle installation, service, maintenance and turnkey project management. In addition, the company provides training programs to staff and customers. MIRATECH also participated with the Heavy Equipment Vehicle Institute at Oklahoma State University, Okmulgee, OK, for engineering student internships and long-term careers.

Product Supply Strategy

MIRATECH sharply focuses on innovative emission solutions for industrial engine applications with product design, sales, technical field service, and project management in niches that are difficult for larger multinational companies to nimbly serve and support. MIRATECH firmly commits to its core competencies of customer relations, sales channel management,



product application knowledge, system design, acoustics, control systems, procurement, training, field service and project management. Manufacturing is coordinated between internal assets and with long-term partners, many of whom work to internationally recognized standards like ISO9001 and Six Sigma.

Product Development and Solutions

MIRATECH's intentions and strategy is to take advantage of its growing size by committing more talent and dollars than were possible in the past to the farsighted development of products and solutions, alone and in partnership with others. These product improvements include substrate designs, catalytic coatings, housing designs, silencers, acoustics, controls and monitoring systems. These development efforts have been historically coordinated with customers, contract research with Southwest Research, VTT in Finland, CARB in California and VERT in Switzerland.

From 2011 to 2013, MIRATECH sponsored a Master's Thesis project in acoustic technology at the University of Pittsburgh. In 2012, MIRATECH commissioned its Innovation Center to continue catalyst, controls development and acoustic research to improve the fundamental knowledge needed for system design and optimization to better serve its partners and customers.

The EGSA Connection and the Value for MIRATECH

The EGSA organization continues to foster mutually beneficial business relationships and increased market awareness for MIRATECH. The forums—including industry conversation, trends, education and codes and standards consensus—are valuable. MIRATECH employees benefit from knowing other market leading technologies and professionals. As EGSA continues to grow, MIRATECH looks forward to leading the market with the highest performing emission products and services in our industry. ■



**OUR SCR SYSTEM
MAINTAINS
COMPLIANCE
AND INCREASES
RUN TIME.**

MIRATECH SCR system reduces NOx and noise with a standards-setting control technology. It is easy to use and easy to enjoy the cost savings that come with it. Call us today to find out how.

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NSCR • SCR • DPF • SILENCER • AFRC • NESHAP CPMS • FIELD SERVICE • TRAINING • TURNKEY



Application for Membership

ELECTRICAL GENERATING SYSTEMS ASSOCIATION

1650 South Dixie Highway, Suite 400, Boca Raton, FL 33432 • 561-750-5575 • FAX 561-395-8557

E-Mail: e-mail@EGSA.org • World Wide Web: www.EGSA.org

Under the leadership of its Board of Directors and operating through its various committees and staff, EGSA strives to educate, provide networking opportunities and share relevant knowledge and trends with industry professionals including manufacturers, distributor/dealers, engineers, manufacturer representatives, contractor/integrators and others serving On-Site Power consumers.

1. Contact Information

Please type or print all information in upper and lower case (NOT ALL CAPS!)

Company _____
Address _____
City _____ State/Province _____
Zip/Postal Code _____ Country _____
Phone _____ FAX _____
Official Representative _____ Title _____
Representative's E-Mail _____ Company's Web Address _____
How did you hear about EGSA? ☐ Web site ☐ Powerline magazine ☐ Colleague ☐ POWER-GEN ☐ Other _____
Why are you joining EGSA? ☐ Certification Program ☐ CEU Program ☐ Power Schools ☐ Buying Guide Listing ☐ Other _____

2. Member Classification

Read the Membership classifications below and check the box that describes your firm's classification.

I. FULL MEMBERSHIP

- ☐ MF **Manufacturer Membership**
Any individual, sole proprietor, partnership or corporation seeking membership must apply for a Full Membership as a manufacturer if they meet one or more of the following criteria:
1. They manufacture prime movers for power generation.
 2. They manufacture generators or other power conversion devices producing electricity.
 3. They manufacture switchgear or electrical control devices.
 4. They manufacture or assemble generator sets, UPS systems, solar power, hydropower, geothermal, or any other power production or conversion system including related components or accessories for national or regional distribution.
 5. They are a wholly owned subsidiary of a firm that qualifies under rules one through four.
- ☐ DD **Distributor/Dealer Membership**
Any individual, sole proprietor, partnership or corporation actively engaged as a distributor or dealer for products listed under Manufacturer Membership may apply for Full Membership as a Distributor/Dealer. If an organization qualifies under Manufacturer Membership, it is not qualified under this section.
- ☐ CI **Contractor/Integrator Membership**
Any individual, sole proprietor, partnership or corporation actively engaged as a Contractor or Equipment Integrator of products listed under Manufacturer Membership, not bound by brand, geographic territory or contractually obligated as a Distributor/Dealer of a specific product. These firms typically purchase products from a Distributor/Dealer, Manufacturer or Retailer, adding value through installation, product knowledge, relationships, unique services, etc., and then re-sell the resulting product to an end-user.
- ☐ MR **Manufacturer's Representative Membership**
Any individual, sole proprietor, partnership or corporation actively engaged in the representation of products listed under Manufacturer Membership may apply for Full Membership as a Manufacturer's Representative. If an organization qualifies under Manufacturer Membership, it is not qualified under this section.
- ☐ EM **Energy Management Company Membership**
Any individual, sole proprietor, partnership or corporation engaged in energy management, including Energy Service Companies (ESCOs), Independent Power Producers (IPPs), Integrators, Aggregators, and other similar enterprises may apply for Full Membership as an Energy Management Company.
- ☐ **Associate Full Membership (mark appropriate category at right)**
Any individual, sole proprietor, academic institution, student, partnership or corporation meeting the requirements of Associate Regular Membership may apply for Full Membership at their option to enjoy the privileges of Full Membership, including the rights to vote and to serve on EGSA's Board of Directors. Initiation fees and annual dues will be assessed at the existing non-manufacturer Full Member rates.

II. ASSOCIATE REGULAR MEMBERSHIP

- ☐ AA **Trade Publication Membership**
Any trade publication dealing with the electrical generating systems industry or its suppliers may apply for Associate Membership—Trade Publications.
- ☐ AB **Trade Association Membership**
Any trade association made up of individual or company members sharing a common interest in the electrical generating systems industry may apply for Associate Membership—Allied Associations.
- ☐ AC **Engineer Membership**
Any consulting or specifying engineer may apply for Associate Membership—Engineer. Membership may either be held in the employer's name or individual's name under this classification. Individuals whose employer qualify as a Full Member, as described in the Full Membership section, do not qualify for this category.
- ☐ AD **End-User Membership**
Any individual employee of a company who owns or operates electrical generating equipment and/or related switchgear or components, whose responsibility to his employer includes planning, design, installation, supervision, or service of such equipment may apply for Associate Membership—User. Membership may either be held in the employer's name or individual's name under this classification. Individuals whose employer qualify as a Full Member, as described in the Full Membership section, do not qualify for this category.
- ☐ AE **Service Membership**
Any individual, organization or academic institution that offers services such as research, testing or repair to the electrical generating systems industry may apply for Associate Membership—Services. Membership may either be held in the individual's name or the organization's name under this classification. Individual companies whose employer or parent organization qualifies as a Full Member, as described in the Full Membership section, do not qualify for this category.
- ☐ AG **Educational Institution Membership**
Any postsecondary vocational-technical school or college offering on-site power generation-related instruction may apply for Associate Membership—Education Institution.
- ☐ AR **Retiree Membership**
Any individual who retires from a member company may apply for Associate Membership—Retired. This classification does not apply to any individual who is employed more than 20 hours per week.
- ☐ AF **Student Membership**
Any individual currently enrolled at an academic institution may apply for Associate Membership—Student.

Application for Membership – page 2

Dues Schedule (Use for Section 3)

	Annual Dues	Initiation Fee	TOTAL
Manufacturer.....	\$870	\$200	\$1070
Distributor/Dealer.....	\$300	\$100	\$400
Contractor/Integrator.....	\$300	\$100	\$400
Manufacturer's Rep.....	\$300	\$100	\$400
Full Associate Member.....	\$300	\$100	\$400
Energy Management Companies.....	\$210	\$100	\$310
Regular Associate Member.....	\$210	\$100	\$310
Retiree Member.....	Complimentary	\$0	\$0
Student Member.....	Complimentary	\$0	\$0

NOTE: A FULL 12-MONTH DUES PAYMENT MUST BE RECEIVED WITH THIS APPLICATION. The Association's Membership Year is January 1 through December 31. Dues payments that extend beyond the first Membership Year will be applied to the second year's dues.

FULL PAYMENT MUST BE RECEIVED WITH APPLICATION.

3. Membership Dues (Please fill in the appropriate TOTAL amount from the above dues schedule.)

Membership Dues \$ _____
Membership Plaque (optional)** \$ 49.95**
On-Site Power Reference Book (optional)** \$ 125.00**
Florida Residents: Add 6% Sales Tax to ** items \$ _____
Continental US Residents add \$5 shipping/handling to ** items. \$ _____
Non Continental US Residents should call EGSA
Headquarters for shipping charges for ** items. **TOTAL** \$ _____

4. Payment Method (Payable in US\$ drawn on U.S. bank, U.S. Money Order, or American Express)

☐ Check # _____ Amount Due \$ _____
☐ Money Order
☐ Mastercard ☐ Visa ☐ American Express
Card # _____ Exp. Date _____
Signature: _____
Print Name: _____

5. Products/Services Please describe the nature of your business (50 words or less, NOT ALL CAPS). If you are a Manufacturer's Representative or Distributor/Dealer, please indicate which manufacturers you represent and/or distribute for; if you are a student, please provide the name and location of your school, your major and your anticipated graduation date:

Do you buy AND sell equipment? ☐ Yes ☐ No

Do you manufacture packaged equipment? ☐ Yes ☐ No

Available Codes:

01 ---Batteries/Battery Chargers	09 ---Generator Laminations	19 ---Silencers/Exhaust Systems/Noise Abatement
02 ---Control/Annunciator Systems	10 ---Generator Sets	20 ---Solenoids
29 ---Education	11 ---Generators/Alternators	21 ---Switchgear and Transfer Switches (Automatic or Manual), Bypass Isolation Switches, and/or Switchgear Panels
30 ---Emission Control Equipment	12 ---Governors	22 ---Trailers, Generator Set
04 ---Enclosures, Generator Set	13 ---Heat Recovery Systems	23 ---Transformers
05 ---Engines, Diesel or Gas	14 ---Instruments and controls, including meters, gauges, relays, contactors, or switches	24 ---Uninterruptible Power Supplies
06 ---Engines, Gas Turbine	15 ---Load Banks	25 ---Vibration Isolators
07 ---Engine Starters/Starting Aids	16 ---Motor Generator Sets	26 ---Voltage Regulators
08 ---Filters, Lube Oil, Fuel or Air	17 ---Radiator/Heat Exchangers	27 ---Wiring Devices or Receptacles
28 ---Fuel Cells	18 ---Relays, Protective or Synchronizing	
03 ---Fuel Tanks and Fuel Storage Systems		

Enter codes here:

Products sold: _____

Products rented: _____

Products serviced: _____

6. Sponsor(s): A "Sponsor" is an EGSA Member who interested you in filling out this application. It is not mandatory that you have a sponsor for the Board to act favorably on this application; however, if a Member recommended that you consider membership, we request that individual's name and company name for our records.

Sponsor Name _____ Company Name _____

7. Official Representative's Authorization

Signature _____ Date _____

NEW EGSA MEMBERS

MF=Manufacturer DD=Distributor/Dealer CI=Contractor/Integrator MR=Manufacturers Rep
EM=Energy Management Co. AA=Trade Publication AB=Trade Association AC=Engineer
AD=End-User AE=Service AG=Educational Institution AR=Retiree AF=Student

Aaron Equipment Company DD
Bensenville, IL
Patrick Paden, Generator Sales Specialist
For more than 75 years, the Aaron Companies have been dedicated to one common goal: To provide our customers with quality equipment, dependable service and competitive prices. We sell used equipment from Hess Microgen, Zenith, ASCO, Cummins, Lake Shore Electric, Perkins, CAT, Deutz and many more.

AMPCO STACKS MF
Grand Rapids, MI
Dustin Isenhoff, Product Specialist
For over 20 years, AMPCO has been a leading manufacturer of quality, multi-use, pressure stack chimney exhaust systems. AMPCO product installations and applications include boilers, generators, commercial kitchen grease duct, laboratory fume hoods and coffee roasters. All AMPCO products are UL tested and listed to the most stringent safety standards, ensuring you the finest product available.

Bear Rock Electric, Inc. CI
Mount Airy, MD
Dr. Nicole Close, Founder and President
Bear Rock Electric, Inc. is a 100 percent woman-owned electrical contractor providing residential and commercial electrical services. Bear Rock Electric provides strategies, products, installation and service for home and commercial standby power needs, as well as being an EcoXpert for Electric Vehicle charging stations.

Charles Industries MF
Rolling Meadows, IL
David Wyrick
Director, Marine & Industrial Business Unit
Charles Industries is a diversified, U.S.-based manufacturer of AC and DC electrical power products. Our portfolio includes industrial-grade high frequency and ferroresonant battery chargers and custom transformers for power control and isolation. Charles products support multiple Industrial market segments, including Oil and Gas, Government/Military, Automotive, Aviation, Tower Lighting and more.

Cummins Rocky Mountain, LLC. DD
Broomfield, CO
Joe Pekarek, VP, Power Generation Svc. Operations
Distributor of Cummins/Onan products. Sales, service and parts for Cummins Power Generation RV generators, commercial and prime power generator sets, transfer switches and switchgear. Available rental generators 25 kW-2MW.

Fueltec Systems LLC MF
Granite Falls, NC
Ron Lenz, Partner
Manufacturer of mobile fuel tank cleaning and automated fuel polishing systems that bring fuel to engine manufacturers cleanliness levels utilizing low cost filter media & micro-glass fuel/water separators.

Instigate, Inc. AE
White Bear Lake, MN
Matt Schreyer, President
Since 1999, Instigate has delivered solutions to help businesses maximize their recruiting resources. Through Recruitment Process Outsourcing [RPO], we strive to level the playing field for businesses who are often challenged to compete for talent without the budgets, time or people that large organizations have at their disposal.

James Madison University AD
Harrisonburg, VA
Lee Paixao, Facilities Management
A division of the University that services in excess of 60 generators.

Kern Williams AD
Lake Placid, FL
Service and repair multiple generator types and transfer panels for military installations.

Modern Group Power Systems DD
Bristol, PA
John McClure, General Manager
We are a Generac dealer, we service all major brands of power generator equipment. Servicing the South Jersey, PA and Delaware areas.

Pinnacle Central Company DD
Polk City, FL
Dewey Winstead, VP
Doosan distributor for portable generators, compressors & light towers. We rent, sell and service generators, compressors, light towers, abrasive blasting equipment.

Quality Light & Heavy Equipment Co. W.LL DD
Shuweikh, Kuwait
Tamal Choaraour, Managing Partner
Quality Equipment is very active in the execution of Electrical Installation projects (Turnkey Projects) in Domestic, Industrial, & Military markets and is very active in Property Operation & Maintenance projects within Kuwait, Qatar and Iraq, offering Long & Short Term Maintenance Contracts and Repair Services.

RGI Enterprises CI
Pottstown, PA
Rick Kritschil, Chief Engineer
RGI integrates multiple alternative power generation platforms and eco-friendly products to provide true sustainable, renewable, off-grid solutions for mobile, commercial, remote, industrial, institutional and government applications. Custom solutions utilizing solar, hydrogen fuel cell or power generators for REQ's 5w-10MW: water generators, waterless sanitation, LED, and biodegradable materials.

SEC Energy Products & Services. DD
Houston, TX
Dale Shows, Operations Manager
We are a gas compression packager who also is a power generation distributor. Our brands include: Baldor, Gillette, Magnum, Tsurumi, Himsen and ASCO.

Tropical Power Ltd. DD
Chaguanas, Trinidad and Tobago
Randy Lee Young, Chief Executive Officer
Tropical Power Limited (TPL) has been in existence for 25 years, and is the Premier Power Systems and Service Company in Trinidad and Tobago, Guyana, and the Caribbean region. We provide standby and prime running emergency power generator rentals, sales and service. Tropical Power Limited is an authorized agent for SDMO generators, ASCO switchgear and an authorized service agent for Kohler Power Systems.

James Pothering AR
Llewellyn, PA

Daryl Anderson AF
Frederick, MD

Gregory Charlestin AF
Irvington, NJ

Marvin Harris AF
Avenel, NJ

Gerald Joyner AF
Newark, NJ

Efrain Matos. AF
Orlando, FL

Joe Matrillo AF
Bloomington, NJ

Fernando McDuffie AF
Sumter, SC

Adam Melendez. AF
Elmhurst Queens, NY

John Reilly AF
Manahaukin, NJ

Christian Vihalva. AF
South Plainfield, NJ

Brian Wilson AF
Barnegat Township, NJ



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Electrical Generators And
Synchronous Motors

What Can We Do To Help You Repair Or Upgrade Your Electrical Generator?



Sales:

Our sales and technical staff is made up of experienced electrical generator technicians and engineers. We are always ready to help you in selecting a product or helping you with a technical question or application assistance.

Service:

We offer same day repair and service on products sent to us by next day air freight. We can normally ship these repairs back to you the same day we receive them. We also offer field supervision for troubleshooting, installation and startup of our systems.

Quality:

All components used in manufacturing of our products are custom made by us or supplied to us from the highest quality manufacturers possible. We never use cheap, surplus or cloned components. All of our products are tested for operation at least 4 times during manufacturing and a final test before packaging to insure that they meet all required specifications.

Engineering:

We can custom build voltage controls and rectified power supplies for generators, synchronous motors, industrial heat treating, machine tools and special projects. We also manufacture DC to DC voltage regulators and voltage regulators for aircraft ground power units.

Product Support Website:

We have an extensive product support website designed to provide detailed information on all of our products, past and present. Product pricing and online ordering is also provided.

For more information visit our website at:
www.power-tronics.com



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GSGnet.net
GlobalSourcingGuide

GLOBAL GENERATOR SETS.com

USA Mid-Atlantic

Technician, Generator - Experienced Emergency Systems Service Company

Location: Quakertown, PA

Emergency Systems Service Company, located in Eastern Pennsylvania, a leading provider of MTU Onsite Energy generator sets, has an immediate opening for a technician with a minimum of three years diesel engine/ generator set experience. Responsibilities will involve troubleshooting, repair and the planned maintenance services of generator sets and related equipment. A neat appearance, clean driving record and good people skills are required. We offer competitive pay, and an outstanding benefits package. A company vehicle and additional training is provided.

EGSA Certified Techs Preferred.

To apply: E-mail resumes to johnkk@emergencysystems-inc.com

Technician, Generator - Apprentice Emergency Systems Service Company

Location: Quakertown, PA

Emergency Systems Service Company, located in Eastern Pennsylvania, a leading provider of MTU Onsite Energy generator sets, has an immediate opening for a person with a strong mechanical/ electrical background interested in a career in the power generation service field.

Responsibilities will involve minor troubleshooting, repair and the planned maintenance services of generator sets and related equipment. A neat appearance, clean driving record and good people skills are required.

We offer competitive pay, and an outstanding benefits package. A company vehicle and additional training is provided.

To apply: E-mail resume to johnkk@emergencysystems-inc.com.

USA Northeast

Inside Sales (Estimator) Ad

Western Branch Diesel

Location: Manassas, VA

Western Branch Diesel, Inc., established in 1946, is looking for an experienced candidate in the Power Generation Industry with inside sales (Estimating) background in the construction industry. This position is for Inside Sales (Estimator) in Northern Va. area. Responsibilities include compiling quotes and create proposals for electrical and general contractors, and consulting engineers to grow the Power Generation Division.

To apply: Jim Malcolm @ jmalcolm@wb diesel.com

USA Northwest

New Business Development / Sales

Electro-Motion, Inc.

Location: Menlo Park, CA USA

This Sales role is designed to generate new contract service business. The majority of the sales effort will be outbound cold calling and emails to prospective commercial customers while scheduling sales meetings as needed.

Our approach is team-based and collaborative. Obtaining new customer contracts is the primary measure of success.

To apply: hr@electromotion.com

EGSA Job Bank Guidelines

EGSA will advertise (free of charge) EGSA Member company job openings in the Job Bank. Free use of the Job Bank is strictly limited to companies advertising for positions available within their own firms. Companies who are not members of EGSA and third-party employment service firms who service our industry may utilize the Job Bank for a \$300 fee. Blind box ads using the EGSA Job Bank address are available upon request; company logos may be included for an additional fee. EGSA reserves the right to refuse any advertisement it deems inappropriate to the publication. To post an EGSA Job Bank ad (limited to approximately 50 words) please visit www.EGSA.org/Careers.aspx.

USA Southeast

Vice President, Sales

Nixon Power Services

Location: Brentwood, TN

Nixon Power Services has an immediate need for a Vice President of Sales in our corporate office, located in Brentwood, TN. The ideal candidate will have extensive knowledge and at least 7 years of experience in sales management and the power generation product sales industry, as well as a bachelors degree from an accredited college. A clean driving record is required. We offer a very competitive compensation package.

To apply: Send resume to resumes@nixonpower.com or fax to 615.309.5839

PSSR

Nixon Power Services

Location: Nashville, TN

The Nixon Power Services Company is interested in hiring a Product Support Sales Representative (PSSR), who is responsible for the sales of service and repair work, preventive maintenance contracts (new and renewal) as well as managing existing accounts and providing superior customer service. Experience in the power generation service/service management field as well as sales experience is preferred. Nixon offers a competitive compensation and benefits package.

To apply: Send resume to resumes@nixonpower.com or fax to 615.309.5839

Installers - All levels of Experience

Nixon Power Services

Location: Atlanta, GA

Nixon Power Services has an immediate need for generator installers, of all levels, in the Atlanta area. A minimum experience level of 2 years with a technical understanding and generator repair, operation and electrical and/or mechanical installations, is required, up to our Lead installer, with at least 5 years of installation experience, who will also be responsible for supervising installation projects. Clean driving record is required. Nixon offers a competitive compensation and benefits package.

To apply: Send resume to resumes@nixonpower.com or fax to 615.309.5839

Assistant Service Manager

Nixon Power Services

Location: Atlanta, GA

Nixon Power Services has an opening for an Assistant Service Manager within the Nixon Energy Solutions (NES) division. This position is responsible for the management of the service center's operations and staff and works closely with external customers as well as various departments within Nixon. A bachelors degree or equivalent experience and basic knowledge of Service Department Management, including an understanding of network applications/ software is preferred. Nixon offers a competitive compensation and benefit package.

To apply: Fax resume to 615.309.5839 or email to resumes@nixonpower.com

Manufacturing Engineer

Phoenix Products

Location: Jacksonville, FL

Phoenix Products, a premier manufacturer of enclosures and fuel tanks for emergency power systems, is seeking experienced engineers for manufacturing engineering openings. The successful candidate will possess an EE or ME degree and will have prior experience with sheet metal and steel fabrication. Proficiency with AutoCAD is required and experience with AutoCad Inventor is a plus. Previous experience in the emergency power industry is a plus. Phoenix Products is a division of Ring Power Corporation. EOE.

To apply: <http://ringpower.com/careers/>

Manufacturer's Rep Seeking Principals

Leading Mid-South manufacturer's rep is seeking additional product lines. We have decades of experience in all aspects of the onsite power generation industry. We are interested in adding quality complementary manufacturers to our line of superior products serving the industry. Our record of outstanding success can help you achieve your sales and market share goals. Please respond if you have an area where you desire additional sales and market share.

Please respond to: J.Kellough@EGSA.org
(Reference PLMJ13JB-1)

EGSA JOB BANK

Manager-Planning and Scheduling

Phoenix Products

Location: Jacksonville, FL

Phoenix Products, a premier manufacturer of enclosures and fuel tanks for emergency power systems, is seeking an experienced manager for its planning and scheduling department. The successful candidate will possess a four year business or technical degree and will have prior experience with production planning and scheduling in a fast paced environment. Proficiency with Microsoft Office and database programs is required. Previous experience in the emergency power industry is a plus. Phoenix Products is a division of Ring Power Corporation. EOE

To apply: <http://ringpower.com/careers>

Engineering Technician

Phoenix Products

Location: Jacksonville, FL

Phoenix Products, a premier manufacturer of enclosures and fuel tanks for emergency power systems, is seeking an experienced draftsman/CAD operator. The successful candidate will possess a minimum of two years of mechanical and electrical design experience using AutoCAD and 3D design software. AutoCAD Inventor experience preferred. Previous experience in the emergency power industry is a plus. Phoenix Products is a division of Ring Power Corporation. EOE.

To apply: <http://ringpower.com/careers>

Manufacturing Management

Phoenix Products

Location: Jacksonville, FL

Phoenix Products, a premier manufacturer of enclosures and fuel tanks for emergency power systems, is soliciting applications for experienced manufacturing management personnel for supervisory and management level positions. The preferred candidate will possess a four year business or technical degree and will have a minimum of 5 years experience of supervisory experience in a metalworking or machinery manufacturing environment. Previous experience in the emergency power packaging is a plus. Phoenix Products is a division of Ring Power Corporation. EOE.

To apply: resumes to rajr1@bellsouth.net

INDUSTRY NEWS

Altaaqa Global and Caterpillar Inc Sign IPP Agreement

Caterpillar Inc. has entered into an international power projects (IPP) agreement with Zahid Group, which recently formed a new subsidiary company, Altaaqa Global. As an IPP partner, Altaaqa Global will provide multi-megawatt temporary power solutions around the world, supported by partnerships within the worldwide Cat® dealer network.

"We have been successfully serving our customers within the Kingdom of Saudi Arabia since our inception," said Fahad Y. Zahid, Executive Vice President of Zahid

"Zahid Group has demonstrated a proven track record of excellent customer service for more than 60 years," said Bill Rohner, Vice President of Electric Power at Caterpillar. "Having them as a strategic partner will help expand Caterpillar's evolving role in the IPP market."

"Caterpillar's global presence and Altaaqa Global's temporary power expertise is a powerful synergy," said Steven Meyrick, Managing Director of Altaaqa Global. "Bringing power to solutions is what we are offering. Bringing power where it is needed, when it is needed."

"Our temporary power plants are mobile, easy to deploy and quick to install," said Peter den Boogert, General Manager, Business Development of Altaaqa Global. "We can intelligently generate electricity within weeks in Africa, the Middle East, Latin America, Asia and the Pacific."

For more information please visit altaaqaglobal.com/pr. ■

Awards Gala on April 13.

In fact, Kaiser has qualified or received an ASA safety award 10 times out of the last 14 years. The criteria for the ASA Midwest Safety Awards is a rigorous process that

evaluates a company's complete commitment to the overall workplace safety and health environment for their employees. Factors considered are recordable injuries, days away lost time incident rates, ongoing safety training, a clear management commitment for safety, and employee participation in the safety process.

Giacin says he tirelessly promotes safety as a company culture and recently revamped Kaiser's safety program to require that workers wear safety glasses and gloves at all times when on a job site. He has even provided workers with four different glove options for performing different tasks and implemented a safety inspection project form that project managers must complete each time they arrive on a job site.

Giacin also holds monthly meetings with his supervisors and bi-monthly meetings with his project management staff with safety always the first item on the agenda for every meeting.



Ken Naumann, Vice-President/Project Manager at Kaiser Electric, and Steve Giacin, President of Kaiser Electric, receive an ASA Safety Award from Mike Sicking, ASA Midwest Council Safety Chairman.



L-R Front Row: Fahad Y. Zahid & Bill Rohner; L-R Back Row: Josh Eggert, Peter den Boogert, Stuart Levenick, Rick Rathe, Steven Meyric

Group. "In 2004, catering to local needs, we launched Altaaqa Alternative Solutions, which later became the world's largest fleet owner of Cat Rental Power with over 750MW in its inventory. Through this IPP agreement, our new subsidiary, Altaaqa Global, will enable us to strengthen our position as a leading provider of turnkey temporary power solutions, now at a global level."

Kaiser Electric President: If You Can't Work Safe, You Can't Work at Kaiser

Steve Giacin, President of Kaiser Electric, has made safety the number one priority at his company, telling his workers that safety is not negotiable, and if they don't want to work safe, then Kaiser is not the company for them.

The awards case in Kaiser Electric's front lobby is a testament to the company's commitment to safety. Kaiser Electric was awarded a Work Safety Excellence Award at the American Subcontractors Association (ASA) - Midwest Council's 20th Anniversary

"From management, to the supervisors to the actual field installers, we don't just talk the talk, we walk the walk," Giacin said. "Creating a company culture for safety needs to start at the top, from my office, with me."

Workers in violation of Kaiser's tough safety standards are first given a verbal warning, followed by a written warning and suspension for not complying a second time. Giacin proudly boasts that his tough safety standards have resulted in an Experience Modification Rate (EMR) as low as .72 for the company. EMR is a number used by insurance companies to gauge both past cost of injuries and future chances of risk. The lower the EMR of a business, the lower its worker compensation insurance premiums will be. An EMR of 1.0 is considered the industry average.

For more information about Kaiser Electric, visit kaiserelectric.com. ■

George Vorreas Promoted to Governmental Account Representative for Foley, Incorporated

Jeff Merle, Vice President of Machinery Sales at Foley, Incorporated announced that George Vorreas has accepted the position of Governmental Account Representative.



Vorreas began his career at Foley in 1997 as a Customer Support Representative (CSR) in the Foley Lift Division. He then went on to work for the Machinery Division as both a CSR and Machinery Sales Account Manager. In the beginning of 2012 he returned to the Foley Rents Division as a Rental Account Manager and in June of 2012, Vorreas transferred back over to the Machinery Sales Division covering the NJ counties of Essex, Hudson and Union.

As Governmental Account Manager, Vorreas will be responsible for all Municipal and Governmental customers in Foley's territory which includes 13 counties in New Jersey, Staten Island, NY and Bermuda. Vorreas will work with these governmental customers to help fulfill their equipment needs with Caterpillar® products, assist them with product specifications and provide support throughout the bid process. "George's experience and knowledge in both the Machinery and Foley Rents divisions will make him a perfect fit for this

position, allowing him to assist our government customers as they choose the right equipment for their needs," stated Merle.

Vorreas will leverage contracts such as the National IPA (National Intergovernmental Purchasing Alliance) and the NJPA (National Joint Powers Alliance) which are cooperative purchasing organizations, established with the specific purpose of reducing procurement costs by leveraging group volume. Caterpillar equipment such as construction, pavement repair/maintenance, material handling, vocational trucks and used equipment are all available to purchase through these contracts.

For more information about Foley Power Systems, visit foleyinc.com. ■

New HIPOWER Team Member Announced

Himoinsa announces that Cody Brewer joined the company on June 4, 2013 in the position of Business Development Manager for Oil and Gas at Himoinsa Power Systems, Inc.



Cody brings to Himoinsa nearly 10 years of experience in Solution Sales and Territory Management. His generator sales (direct, indirect) and rental experience covers sizes from 35kW to 10MW. Cody has worked with customers who have temporary power needs like Special Events, Electrical Contractors, Government, Industrial, Chemical, and more specifically the Oil and Gas production sites throughout the Mississippi Lime Play in Northern Oklahoma and Southern Kansas.

Cody most recently was the Aggreko Territory Manager for Oklahoma and Amarillo, TX area and provided Rental Power solutions to Natural Gas Production companies such as Devon Energy, Chesapeake, Midstate, DCP Midstream, and GE Oil and Gas. He is dedicated to his sales career by being accountable to his customers and providing solutions that will match the customer's needs whether it be a planned outage/shutdown, helping local utility grids with peak shaving, or a response to a natural disaster power emergency.

Cody and his wife Sarah are currently located in Oklahoma City, OK. He holds a B.S. Criminal Justice degree, and is a Veteran of the US Navy and Oklahoma Army National Guard Officer Candidate School.

He also has been a volunteer for Central Oklahoma REACT where he has helped with Search and Rescue/Recovery operations, storm spotting/chasing, and currently helps as a storm spotter for a local news network.

"We strongly believe that the experience and knowledge that Cody brings to Himoinsa will support our team's efforts and will help further Himoinsa's growth in the oil and gas industry." Said President, Rafael Acosta.

For more information about Himoinsa Power Systems, visit hipowersystems.com. ■

Kaiser Electric Hires Senior Project Manager Steven Elfrink

Kaiser Electric recently hired Steven Elfrink of LeMay, MO as a Senior Project Manager. Elfrink will manage and estimate projects in Kaiser's commercial, industrial and institutional markets.



Elfrink has more than 35 years of industry experience. Prior to Kaiser, Elfrink worked as a project manager for TD4 Electrical in St. Louis, MO; a project manager/service estimator for Bell Electrical Contractors in Maryland Heights, MO; a project manager for Champion Electric in St. Louis, MO and as an estimator for Schneider Electric and CJ Hervey Electric, both in St. Louis, MO.

Elfrink is a member of the Electrical Board of Missouri and Illinois. He graduated from ITT Technical School with a degree in drafting and majored in Electrical Engineering at Southern Illinois University - Edwardsville.

For more information about Kaiser Electric, visit kaiserelectric.com. ■

Universal AET Acquires Ojibway Enclosure Systems

Universal Acoustic & Emission Technologies' Board of Directors has voted to purchase Ojibway Enclosure Systems, a manufacturer of enclosures and packager of generator sets for power generation systems.

Ojibway also does laser cutting, welding and forming of a variety of metal products, and it assists in the installation of generator sets in the field. Ojibway's offices and its production facility are in Janesville, WI.

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"Our key customers in the power generation market are looking for a complete air-handling solution for their turbine system. These customers want a one-stop shop – a single company providing the air inlet and exhaust system, ducting, diffusers and enclosure," said Universal AET Executive Vice President Dick Strojinc. "We have been supplying silencers to Ojibway for many years. During that time, we have seen how Ojibway offers innovative designs and is willing to adapt projects on a case-by-case basis to satisfy our customers. We share Ojibway's commitment to providing outstanding service and customized solutions."

Ojibway and Universal AET are now in a better position to serve their common customers: engine distributors who source silencers, emissions treatment products or complete power generation packages for data centers, hospitals and other large-scale facilities that require standby power generators. "Now that Ojibway will be part of Universal AET, our staffs can work together seamlessly, and our customers' projects will be managed by just one contact," Strojinc said.

Ojibway's products will be branded Ojibway Enclosures by Universal beginning immediately. All of the employees will be retained, and they will continue to work at their current locations.

Ojibway Enclosure Systems evolved from Midwest Laser Fabricating, a sheet metal fabricating company started by Rich Pember. He then launched Ojibway Enclo-

sure Systems to manage the growing business of packaging generator sets within enclosures that help protect some of the largest computer server backup systems in the world. Ojibway ultimately absorbed Midwest Laser Fabricating. The company and its history was featured in a Janesville Gazette business article just last month.

For more information about Universal, visit universalaet.com. ■

Collicutt Energy Services Appoints David Brown as Company President

Mr. Brown comes to Collicutt Energy Services from Kohler Power Systems where he held the position of Vice President. Mr. Brown has also held executive positions at Multiquip and Cummins Cal-Pacific.



"David has more than 25 years of industry knowledge and leadership experience in power generation. His diversity and entrepreneurial spirit is a perfect fit for our company" said Steven Collicutt, CEO, Collicutt Energy Services.

David is a graduate of Marquette University with an MBA in Global Finance and Economics and also holds a Bachelor of Science in Mechanical Engineering from the University of Memphis.

For more information about Kaiser Collicutt Energy Services, visit collicutt.com. ■

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